VOLUME 21 / NUMBER 14
JULY 23, 1983
ACC. NOS. N83-24466 TO N83-25650

AUG 3 0 1983

The University
of Michigan
Astronomy
Library

ASTRONOMY
QL
501
S42
v. 21
no. 14

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

ROOM USE ONLY

25th Anniversary
1958-1983

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

INTRODUCTION

The University
of Michigan
Astronomy
Library

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NIT-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey Library
National Center – MS 950
12201 Sunrise Valley Drive
Reston, Virginia 22092

U.S. Geological Survey Library
2255 North Gemini Drive
Flagstaff, Arizona 86001

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey Library
Box 25046
Denver Federal Center, MS 914
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-- 1	-- 2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 21 NUMBER 14/JULY 23, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 2161

02 AERODYNAMICS 2161

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 2164

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation*.

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 2165

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications*.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 2166

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics*.

06 AIRCRAFT INSTRUMENTATION 2167

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography*.

07 AIRCRAFT PROPULSION AND POWER 2167

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

08 AIRCRAFT STABILITY AND CONTROL 2168

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 2169

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space)*.

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 2170

For extraterrestrial exploration see *91 Lunar and Planetary Exploration*.

13 ASTRODYNAMICS 2170

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) 2171

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air)*.

15 LAUNCH VEHICLES AND SPACE VEHICLES 2171

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 2172

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation*.

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications*.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 2173

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support*. For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics*.

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography*.

20 SPACECRAFT PROPULSION AND POWER 2174

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels*, and *44 Energy Production and Conversion*.

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 2175
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 2176
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 2178
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 2188
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 2196
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 2199
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 2201
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 2203
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 2207
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 2211
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 2216
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 2217
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 2219
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 2222
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 2223
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) 2229

43 EARTH RESOURCES 2239
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 2245
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 2271
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 2274
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 2280
Includes weather forecasting and modification.

48 OCEANOGRAPHY 2289
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) **2290**
Includes genetics.

52 AEROSPACE MEDICINE **2291**
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES **2295**
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT **2295**
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY **N.A.**
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) **2296**

60 COMPUTER OPERATIONS AND HARDWARE **2296**
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE **2297**
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS **2303**
Includes computer networks.

63 CYBERNETICS **N.A.**
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS **2303**
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY **2310**
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS **2311**
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS **2312**
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) **2312**
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS **2313**
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS **2314**
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS **2317**
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS **2319**
Includes light phenomena.

75 PLASMA PHYSICS **2323**
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS **2327**
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS **2331**
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) **N.A.**
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT **2332**
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **2332**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **2332**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **2333**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **2333**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **2334**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **2334**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **2335**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **2335**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **N.A.**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

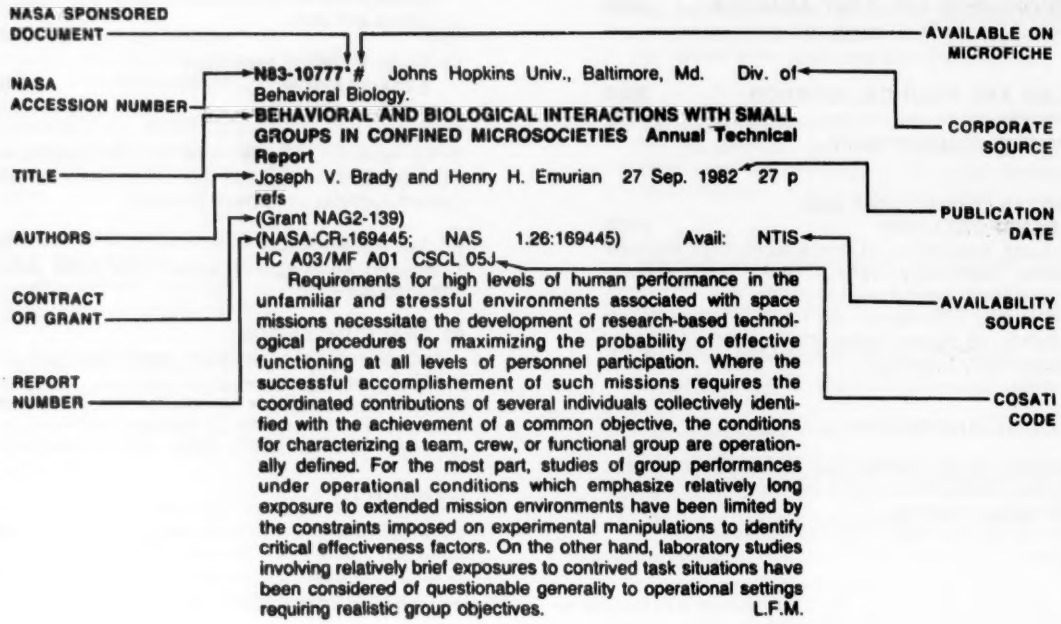
GENERAL

99 GENERAL **2337**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-69**
CORPORATE SOURCE INDEX **I-79**
CONTRACT NUMBER INDEX **I-95**
REPORT/ACCESSION NUMBER INDEX **I-99**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777* # Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS
AVAILABILITY SOURCE
HC A03/MF A01 CSCL 05J
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 14/JULY 23, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-24466* National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY WITH INDEXES, SUPPLEMENT 160, APRIL 1983
Apr. 1983 124 p
(NASA-SP-7037(160); NAS 1.21:7037(160)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 437 reports, articles and other documents introduced into the NASA Scientific and Technical Information System in March 1983. Author

N83-24467*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFICIENT SOLUTION OF THE EULER AND NAVIER-STOKES EQUATIONS WITH A VECTORIZED MULTIPLE-GRID ALGORITHM
Rodrick V. Chima and Gary M. Johnson 1983 31 p refs Proposed for presentation at the 6th Computational Fluid Dyn. Conf., Danvers, Mass., 13-15 Jul. 1983; sponsored by AIAA
(NASA-TM-83376; E-1644; NAS 1.15:83376) Avail: NTIS HC A03/MF A01 CSCL 01A

A multiple-grid algorithm for use in efficiently obtaining steady solutions to the Euler and Navier-Stokes equations is presented. The convergence of the explicit MacCormack algorithm on a fine grid is accelerated by propagating transients from the domain using a sequence of successively coarser grids. Both the fine and coarse grid schemes are readily vectorizable. The combination of multiple-gridding and vectorization results in substantially reduced computational times for the numerical solution of a wide range of flow problems. Results are presented for subsonic, transonic, and supersonic inviscid flows and for subsonic attached and separated laminar viscous flows. Work reduction factors over a scalar, single-grid algorithm range as high as 76.8. M.G.

N83-24468# Systems Technology, Inc., Hawthorne, Calif.
PROPOSED MIL STANDARD AND HANDBOOK: FLYING QUALITIES OF AIR VEHICLES. VOLUME 1: PROPOSED MIL STANDARD Final Report, Apr. 1980 - Jul. 1982
Roger H. Hoh, David G. Mitchell, Irving L. Ashkenas, Richard H. Klein, Robert K. Heffley, and John Hodgkinson (McDonnell Aircraft Co.) Wright-Patterson AFB, Ohio AFWAL Nov. 1982 59 p
(Contract F33615-80-C-3604; AF Proj. 2403)
(AD-A123674; AFWAL-TR-82-3081-Vol-1) Avail: NTIS HC A04/MF A01 CSCL 05/2

This report is a proposed version of the MIL Standard and Handbook developed by Systems Technology, Inc., with the McDonnell Aircraft Co. acting in a consulting role. This report is published to elicit comments, and suggestions, for adopting or revising the material which the Government will incorporate into an official MIL Standard and Handbook. As it stands, the material is preliminary and occasionally controversial, does not in all cases represent the views of the Government or a particular government organization, and should not be used for procurement. This work does not reflect work in progress on flying qualities requirements for large airplanes, direct force controllers or STOL aircraft. GRA

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-24469*# Michigan State Univ., East Lansing. Turbulence Structure Lab.
A STUDY OF THE EFFECTS OF LEBU DEVICES ON TURBULENT BOUNDARY LAYER DRAG Final Technical Report, 1 Nov. 1981 - 31 Oct. 1982
R. E. Falco May 1983 20 p refs
(Grant NAG1-221)
(NASA-CR-170313; NAS 1.26:170313) Avail: NTIS HC A02/MF A01 CSCL 01A

Initial measurements of the changes in local skin friction, velocity profile shape, and turbulence structure which result from the placement of tandem plates parallel to the wall in the outer region of thick turbulent boundary layers were made. Using a tunnel with a .75 m x 1.2 m x 7.3 m test section, which diverged so as to keep the pressure gradient less than 2x1000/ft, on the test wall, a skin friction reduction of approximately 30% was measured at xi/h = 62. This relaxed to a reduction of approximately 16% at xi/h = 124 for h/delta M = .6. The c sub f measurements for both the normal and modified boundary layers were obtained by measuring the slope of the velocity profile within the linear sublayer. Visual results indicated a continued presence of strong large eddy structure downstream of the devices. Local skin friction reduction of 12% at xi/h = 62 was also obtained with the manipulators above the boundary layer at y/delta m = 1.1. Author

N83-24470*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
END-WALL BOUNDARY LAYER MEASUREMENTS IN A TWO-STAGE FAN
Calvin L. Ball, Lonnie Reid, and James F. Schmidt 1983 24 p refs Presented at the Propulsion Energetics Panel 61st A Specialists' Meeting, Copenhagen, 1-3 Jun. 1983; sponsored by AGARD
(NASA-TM-83409; E-1692; NAS 1.15:83409) Avail: NTIS HC A02/MF A01 CSCL 01A

Detailed flow measurements made in the casing boundary layer of a two-stage transonic fan are summarized. These measurements were taken at a station upstream of the fan, between all blade rows, and downstream of the last row. Conventional boundary layer parameters were calculated from the measured data. A classical two dimensional casing boundary layer was measured at

the fan inlet and extended inward to approximately 15 percent of span. A highly three dimensional boundary layer was measured at the exit of each blade row and extended inward to approximately 10 percent of span. The steep radial gradient of axial velocity noted at the exit of the rotors was reduced substantially as the flow passed through the stators. This reduced gradient is attributed to flow mixing. The amount of flow mixing was reflected in the radial redistribution of total temperature as the flow passed through the stators. The blockage factors calculated from the measured data show an increase in blockage across the rotors and a decrease across the stators. For this fan the calculated blockages for the second stage were essentially the same as those for the first stage. Author

N83-24471*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOADS AND PERFORMANCE DATA FROM A WIND-TUNNEL TEST OF MODEL ARTICULATED HELICOPTER ROTORS WITH 2 DIFFERENT BLADE TORSIONAL STIFFNESSES
William T. Yeager, Jr. and Wayne R. Mantay Apr. 1983 322 p refs
(NASA-TM-84573; L-15507; NAS 1.15:84573; AVRADCOM-TR-82-B-9) Avail: NTIS HC A14/MF A01 CSCL 01A

A passive means of tailoring helicopter rotor blades to improve performance and reduce loads was evaluated. The parameters investigated were blade torsional stiffness, blade section camber, and distance between blade structural elastic axis and blade tip aerodynamic center. This offset was accomplished by sweeping the tip. The investigation was conducted at advance ratios of 0.20, 0.30, and 0.40. Data are presented without analysis; however, cross referencing of performance data and harmonic loads data may be useful to the analyst for validating aeroelastic theories and design methodologies as well as for evaluating passive aeroelastic tailoring or rotor blade parameters. M.G.

N83-24472*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
TRENDS OF REYNOLDS NUMBER EFFECTS ON TWO-DIMENSIONAL AIRFOIL CHARACTERISTICS FOR HELICOPTER ROTOR ANALYSES
G. K. Yamauchi and Wayne Johnson Apr. 1983 45 p refs
(NASA-TM-84363; A-9343; NAS 1.15:84363) Avail: NTIS HC A03/MF A01 CSCL 01A

The primary effects of Reynolds number on two dimensional airfoil characteristics are discussed. Results from an extensive literature search reveal the manner in which the minimum drag and maximum lift are affected by the Reynolds number. C sub d sub min and C sub l sub max are plotted versus Reynolds number for airfoils of various thickness and camber. From the trends observed in the airfoil data, universal scaling laws and easily implemented methods are developed to account for Reynolds number effects in helicopter rotor analyses. S. L.

N83-24473*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE EFFECT OF ASYMMETRIC ATTACK ON TRIM ANGLE OF ATTACK
Robert L. Kruse May 1983 16 p refs
(NASA-TM-84309; A-9164; NAS 1.15:84309) Avail: NTIS HC A02/MF A01 CSCL 01A

Ballistic range tests were conducted to determine the effect of an asymmetrically ablated heat shield on the trim angle of attack of an entry vehicle. The tests, which were in support of Project Galileo, were conducted in atmospheric air at Mach numbers from 0.7 to 2.0. For the results for the configuration that was tested, the deduced trim angle varied between 13 deg and 21 deg. Author

N83-24474*# Universities Space Research Association, Columbia, Md.
IMPROVED DESIGN OF SUBCRITICAL AND SUPERCRITICAL CASCADES USING COMPLEX CHARACTERISTICS AND BOUNDARY LAYER CORRECTION Final Report
Jose M. Sanz May 1983 16 p refs
(Contract NAS3-22531)
(NASA-CR-168166; NAS 1.26:168166) Avail: NTIS HC A02/MF A01 CSCL 01A

The method of complex characteristics and hodograph transformation for the design of shockless airfoils was extended to design supercritical cascades with high solidities and large inlet angles. This capability was achieved by introducing a conformal mapping of the hodograph domain onto an ellipse and expanding the solution in terms of Tchebycheff polynomials. A computer code was developd based on this idea. A number of airfoils designed with the code are presented. Various supercritical and subcritical compressor, turbine and propeller sections are shown. The lag-entrainment method for the calculation of a turbulent boundary layer was incorporated to the inviscid design code. The results of this calculation are shown for the airfoils described. The elliptic conformal transformation developed to map the hodograph domain onto an ellipse can be used to generate a conformal grid in the physical domain of a cascade of airfoils with open trailing edges with a single transformation. A grid generated with this transformation is shown for the Korn airfoil. S.L.

N83-24475# National Aerospace Lab., Tokyo (Japan).
AN APPROXIMATE METHOD OF ESTIMATING THE AERODYNAMIC INTERFERENCE BETWEEN 2 PARALLEL BODIES IN A SUPERSONIC FLOW (AXIAL FORCE)
Hirofumi Kondo 1983 17 p refs In JAPANESE; ENGLISH summary
(NAL-TR-751; ISSN-0381-0010) Avail: NTIS HC A02/MF A01

The present study deals with an approximate method of estimating the aerodynamic interference between two parallel bodies in a supersonic flow. The formulae are derived from the linearized theory. The formulae for calculating the wave drag on one body are obtained as functions of Mach number, cone semivertex angle, and the relative distances between bodies. Theoretical calculations are compared with wind tunnel test results, and fairly good agreement is noted between them at certain restricted regions, depending on Mach number, cone vertex angle, and relative distances between bodies. It is pointed out that the present method can easily be applied to a combination of more than two bodies. Author

N83-24476# National Aerospace Lab., Tokyo (Japan).
AN APPROXIMATE ANALYSIS FOR FLAT NOSED BODY IN SUPERSONIC FLOW (WITHOUT ATTACK ANGLE)
Hideo Sekine and Takashi Tani 1982 10 p refs In JAPANESE; ENGLISH summary
(NAL-TR-747; ISSN-0389-0010) Avail: NTIS HC A02/MF A01

A simple estimation of surface pressure distribution for a flat nosed body in supersonic flow is presented in this paper. From the results of experiments, it is well known that the detached shock wave ahead of the nose surface is a nearly uniform normal shock wave and the nose surface can be approximated by the incompressible potential flow theory. The detachment distance is represented in semiempirical form, and the results show that the mean outgoing velocity between the shock wave and the nose surface at the edge of the flat nose has a constant value of 0.40a*, independent of the free stream Mach number. With a boundary condition based on this constant velocity, the surface pressure distribution around the stagnation point on an arbitrary shape flat nosed body can be calculated, and the results show good agreement with the experimental value. This estimation can be extended to a nose with a small curvature, also. Author

N83-24477# National Aerospace Lab., Tokyo (Japan).
CALCULATION OF UNSTEADY TRANSONIC POTENTIAL FLOW OVER 3-DIMENSIONAL WINGS WITH OSCILLATING CONTROL SURFACES
Koji Isogai and Kohei Suetsugu [1982] 21 p refs In JAPANESE; ENGLISH summary
(NAL-TR-746; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

In this paper, numerical calculations are made of the unsteady

transonic potential flow over three dimensional wings with oscillating contol surfaces. For this purpose, a new grid system, which is appropriate for solving the control surface problems, is introduced into the computer code USTF3, which solves the unsteady 3D full potential equation by a time marching semiimplicit and implicit two sweep finite difference procedure. To validate the code, the unsteady pressure distributions are calculated on both the NLR Swept Tapered Wing with an inboard control surface and on the RAE Swept Tapered Wing with a part span control surface. The results are compared with existing theories and experimental data. The potential power of USTF3 as a numerical simulator for the time domain simulation of a flutter suppression system is also demonstrated by calculating the time dependent aeroelastic responses of the NASA Supercritical Wing flutter model with a part span control surface. Author

N83-24478*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
EFFECTS OF TWIN-VERTICAL-TAIL PARAMETERS ON TWIN-ENGINE AFTERBODY/NOZZLE AERODYNAMIC CHARACTERISTICS
Laurence D. Leavitt and E. Ann Bare May 1983 106 p refs
(NASA-TP-2158; L-15570; NAS 1.60:2158) Avail: NTIS HC A06/MF A01 CSCL 01A

The Langley 16-foot transonic tunnel was used to determine the effects of several empennage and afterbody parameters on twin-engine aft-end aerodynamic characteristics. Model variables included twin-vertical-tail cant angle, toe angle, airfoil camber, and root-chord length and afterbody/engine interfairing shape. Tests were conducted over a Mach number range from 0.6 to 1.2 and over an angle-of-attack range from 2 deg to 10 deg. Nozzle pressure ratio was varied from 1.0 (jet off) to approximately 10.0. Author

N83-24479*# Boeing Commercial Airplane Co., Seattle, Wash.
AEROELASTIC LOADS PREDICTION FOR AN ARROW WING. TASK 3: EVALUATION OF THE BOEING THREE-DIMENSIONAL LEADING-EDGE VORTEX CODE Final Report
Marjorie E. Manro Washington NASA Apr. 1983 216 p refs
(Contract NAS1-15678)
(NASA-CR-3642; NAS 1.26:3642; D6-51762-3) Avail: NTIS HC A10/MF A01 CSCL 01A

Two separated flow computer programs and a semiempirical method for incorporating the experimentally measured separated flow effects into a linear aeroelastic analysis were evaluated. The three dimensional leading edge vortex (LEV) code is evaluated. This code is an improved panel method for three dimensional inviscid flow over a wing with leading edge vortex separation. The governing equations are the linear flow differential equation with nonlinear boundary conditions. The solution is iterative; the position as well as the strength of the vortex is determined. Cases for both full and partial span vortices were executed. The predicted pressures are good and adequately reflect changes in configuration. S.L.

N83-24480# European Space Agency, Paris (France).
DEVELOPMENT OF THE FLOW FIELD IN STREAMWISE CORNERS AT HYPERSONIC SPEEDS AND EFFECTS OF THE CORNER FLOW ON DOWNSTREAM FITTED FLAPS Ph.D. Thesis - Rhenish-Westphalian Tech. Coll. Aix-la-Chapelle
Hermann-Josef Schepers Dec. 1982 114 p refs Transl. into ENGLISH from "Ausbildung des Stroemungsfeldes in laengsangestroemten Ecken und Auswirkungen auf stromabwaerts angeordnete Klappen bei Hyperschallanstroemung". DFVLR, Cologne Rept. DFVLR-FB-78-23, Aug. 1978
(ESA-TT-583; DFVLR-FB-78-23) Avail: NTIS HC A06/MF A01; original report in GERMAN available from DFVLR, Cologne DM 49,80

A description is given of the results obtained from investigations carried out on three different configurations of streamwise corners. The experiments were conducted at a free stream Mach number of M = 8.8 and a Reynolds number of Re/m = 4,566,000 in the hypersonic wind tunnel. The pitot pressure, static pressure and total temperature in the flow field were measured, so that it was possible to determine the essential flow quantities. A semi-empirical analysis drawn up on the basis of known shock relations revealed that the state variables behind curved secondary shocks coincide nearly with the experimental results. The major characteristics of the near to wall flow were both pointed out and explained in the corner by making the wall streamlines visible and by measuring the heat transfer and static pressure at the wall. An approximate correlation was achieved between the calculation and the experiment in the estimation of the influences on the rudder efficiency produced by the corner flows. S.L.

N83-24481# Visidyne, Inc., Burlington, Mass.
BAMM II FLIGHT, 30 APRIL 1982, ENGINEERING EVALUATION
R. W. Brooke, C. Shepherd, and W. P. Reidy Hanscom AFB, Mass. AFGL 1 Jul. 1982 135 p
(Contract F19628-82-C-0043; AF Proj. 2123)
(AD-A124292; AFGL-TR-82-0189; VI-644; SR-1) Avail: NTIS HC A07/MF A01 CSCL 01/3

The objectives of the BAMM II flight of 30 Apr 1982 were as follows: Infrared earth/atmosphere background at sunrise and low angle solar specular reflections; Infrared earth background - snow fields; and Infrared earth background - mountains. Data was obtained from three types of scenes. However, due to a command system malfunction, the number of scene measurements was reduced. During the flight, the command link was subjected to frequent intermittent disruption. The cause of this command problem is under investigation. In spite of the command link disruption, it appears that all the objectives of the flight were realized. When it could be commanded, the pointing system operated without problems. In the following sections, payload testing, flight operations and recovery will be discussed. A daily summary of activities during the field expedition is presented in Appendix A. Summary reports on the batteries and command system problems are included as Appendixes B and C. An evaluation of the payload system is made with recommendations for additional system improvements. GRA

N83-24482# Flow Research, Inc., Kent, Wash. Research and Technology Div.
CALCULATION OF TRANSONIC POTENTIAL FLOW AROUND A WING-BODY-TAIL COMBINATION Final Report, 7 May 1980 - 30 Sep. 1981
John Mercer, Wen-Huei Jou, and Margaret Johnson Apr. 1982 39 p refs
(Contract N00014-80-C-0453)
(AD-A124247; FR-227) Avail: NTIS HC A03/MF A01 CSCL 20/4

An embedded mesh system for transonic flow analysis is described. The method has been applied to the finite-volume potential flow calculation of flows around wing-body-tail configurations. A local C-type mesh is fitted to a horizontal tail mounted on a wing-body around which a wraparound c-type mesh has also been used. Sample calculations for a modified A-7 configuration and another wing-body-tail configuration are given. The results show rapid convergence and excellent details of pressure distribution over the entire configuration in both cases. Author (GRA)

N83-24483# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
COMPUTER PREDICTION OF STORE AERODYNAMIC LOADING DURING SEPARATION M.S. Thesis
Arthur C. Powell Dec. 1982 180 p refs
(AD-A124693; AFIT/GAE/AA/82D-22) Avail: NTIS HC A09/MF A01 CSCL 09/2

An advanced fighter design is modeled using the Nielsen store separation and trajectory program with the non-circular fuselage cross section option. The theory required to build the computer model is consolidated for better understanding, with the major points referenced to the appropriate report. The details of the process to generate the computer model are described. The

computer model of the aircraft and ogive store is used to predict store forces and moments which are compared with wind tunnel results on the same configuration. The prediction accuracy, at Mach number 0.6, at a store position of three store diameters away from the aircraft, is within ten percent of experiment in the region of interest, which is the area under that portion of the fuselage occupied by the wing. Author (GRA)

N83-24484# TCOM Corp., Columbia, Md.
COLD WEATHER AEROSTAT STUDY Final Report, 14 Jun. - 30 Sep. 1982
Robert L. Ashford Oct. 1982 159 p
(Contract F19628-82-C-0113; AF Proj. 2892)
(AD-A123407; AFGL-TR-82-0278) Avail: NTIS HC A08/MF A01 CSCL 04/2

Aerostats are being considered for application in cold weather regions. A review of aerostat flight experience to date was made to determine the limitations of the current technology. Areas for improvements and modifications to extend the aerostat system cold weather survivability/operability were also made.
Author (GRA)

N83-24485# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
TRANSONIC SHOCK-TURBULENT BOUNDARY LAYER INTERACTIONS ON SPINNING AXISYMMETRIC BODIES AT ZERO ANGLE OF ATTACK Final Report
George R. Inger Jan. 1983 77 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A123389; ARBRL-TR-02458) Avail: NTIS HC A05/MF A01 CSCL 20/4

This report presents a detailed triple-deck theory of the transonic shock-nonseparating turbulent boundary layer interaction zones on spinning axisymmetric bodies at zero angle of attack. The theory allows a general non-equilibrium turbulent boundary layer history upstream of the interaction. We further describe the application of this theory as a local interactive module imbedded in a global composite viscous-inviscid transonic flow field prediction method which can handle two or more such interaction zones. Detailed comparisons with both experimental data and thin-layer Navier-Stokes code predictions are presented to verify the accuracy and reliability of the composite method solutions for pressure, displacement thickness, velocity profiles, shape factor and skin friction distributions along the body over a wide range of Mach/Reynolds number conditions. Author (GRA)

N83-24486# Sandia Labs., Albuquerque, N. Mex. Parachute Systems Div.
AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THE REDUCTION IN PARACHUTE DRAG CAUSED BY FOREBODY WAKE EFFECTS: DATA COMPILATION AND PROGRAM SUMMARY
Carl W. Peterson and Donald W. Johnson Nov. 1982 43 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005364; SAND-81-0510) Avail: NTIS HC A03/MF A01

An experiment was conducted to evaluate approximate analytical methods for predicting the reduction in parachute drag caused by forebody wake effects. The drag of a 200 conical ribbon parachute was measured at several axial stations behind an ogive cylinder forebody with and without fins. The same parachute was tested in undisturbed flow (where wake effects were negligible) so that the effects of suspension line length on parachute drag could be separated from the drag losses caused by the turbulent wake. Total head pressure surveys were made across the forebody wake and integrated across the canopy skirt area to determine the effective dynamic pressure acting on the parachute. Experimental results confirmed the validity of the underlying physical model of the parachute/wake interaction: the ratio of parachute drag behind a forebody divided by wake-free parachute drag is equal to the ratio of effective dynamic pressure acting on the parachute divided by free-stream dynamic pressure. DOE

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-24487*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPERIMENTAL COMPARISON OF ICING CLOUD INSTRUMENTS
W. Olsen, D. Takeuchi (Meteorology Research, Inc.), and K. Adams (Air Force Flight Test Center) 1983 27 p refs Presented at the 21st Aerospace Sci. Conf., Reno, Nev., 10-13 Jan. 1983; sponsored by AIAA
(NASA-TM-83340; E-1595; NAS 1.15:83340; AIAA-83-0026) Avail: NTIS HC A03/MF A01 CSCL 01D

Icing cloud instruments were tested in the spray cloud Icing Research Tunnel (IRT) in order to determine their relative accuracy and their limitations over a broad range of conditions. It was found that the average of the readings from each of the liquid water content (LWC) instruments tested agreed closely with each other and with the IRT calibration; but all have a data scatter (+ or - one standard deviation) of about + or - 20 percent. The effect of this + or - 20 percent uncertainty is probably acceptable in aero-penalty and deicer experiments. Existing laser spectrometers proved to be too inaccurate for LWC measurements. The error due to water runoff was the same for all ice accretion LWC instruments. Any given laser spectrometer proved to be highly repeatable in its indications of volume median drop size (DVM), LWC and drop size distribution. However, there was a significant disagreement between different spectrometers of the same model, even after careful standard calibration and data analysis. The scatter about the mean of the DVM data from five Axial Scattering Spectrometer Probes was + or - 20 percent (+ or - one standard deviation) and the average was 20 percent higher than the old IRT calibration. The + or - 20 percent uncertainty in DVM can cause an unacceptable variation in the drag coefficient of an airfoil with ice; however, the variation in a deicer performance test may be acceptable. S.L.

N83-24488*# Lockheed-California Co., Burbank.
ANALYTICAL MODELING OF TRANSPORT AIRCRAFT CRASH SCENARIOS TO OBTAIN FLOOR PULSES Technical Report, Nov. 1981 - Jul. 1982
Gil Wittlin and Dave Lackey Apr. 1983 196 p refs Sponsored in part by Federal Aviation Administration
(Contract NAS1-16083)
(NASA-CR-166089; NAS 1.26:166089; FAA-CT-83-23; LR-30141) Avail: NTIS HC A10/MF A01 CSCL 01C

The KRAS program was used to analyze transport aircraft candidate crash scenarios. Aircraft floor pulses and seat/occupant responses are presented. Results show that: (1) longitudinal only pulses can be represented by equivalent step inputs and/or static requirements; (2) the L1649 crash test floor longitudinal pulse for the aft direction (forward inertia) is less than 9g static or an equivalent 5g pulse; aft inertia accelerations are extremely small ((ch76) 3g) for representative crash scenarios; (3) a viable procedure to relate crash scenario floor pulses to standard laboratory dynamic and static test data using state of the art analysis and test procedures was demonstrated; and (4) floor pulse magnitudes are expected to be lower for wide body aircraft than for smaller narrow body aircraft. A.R.H.

N83-24489# Civil Aeromedical Inst., Oklahoma City, Okla.
CRASH INJURY PROTECTION IN SURVIVABLE AIR TRANSPORT ACCIDENTS: UNITED STATES CIVIL AIRCRAFT EXPERIENCE FROM 1970 THROUGH 1978 (INCOMPLETE) Final Report
Richard F. Chandler, Donell W. Pollard, Lawrence M. Neri, and Caesar A. Caiafa Atlantic City Mar. 1983 133 p refs Prepared in cooperation with FAA, Atlantic City
(FAA-CT-82-118) Avail: NTIS HC A07/MF A01

Twenty-seven survivable ground accidents and 3 inflight accidents occurring from 1970 through 1978 were reviewed. Twenty-five of the ground accidents and all of the inflight accidents involved reports of seat or restraint performance. Comparisons of injury and fatality rates are made with studies involving earlier model aircraft accidents. Author

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-24490*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

A SIMULATION STUDY OF CREW PERFORMANCE IN OPERATING AN ADVANCED TRANSPORT AIRCRAFT IN AN AUTOMATED TERMINAL AREA ENVIRONMENT

Jacob A. Houck May 1983 67 p refs

(NASA-TM-84610; L-15486; NAS 1.15:84610) Avail: NTIS HC A04/MF A01 CSCL 17G

A simulation study assessing crew performance operating an advanced transport aircraft in an automated terminal area environment is described. The linking together of the Langley Advanced Transport Operating Systems Aft Flight Deck Simulator with the Terminal Area Air Traffic Model Simulation was required. The realism of an air traffic control (ATC) environment with audio controller instructions for the flight crews and the capability of inserting a live aircraft into the terminal area model to interact with computer generated aircraft was provided. Crew performance using the advanced displays and two separate control systems (automatic and manual) in flying area navigation routes in the automated ATC environment was assessed. Although the crews did not perform as well using the manual control system, their performances were within acceptable operational limits with little increase in workload. The crews favored using the manual control system and felt they were more alert and aware of their environment when using it. B.G.

N83-24491# Systems Control Technology, Inc., West Palm Beach, Fla.

ALASKA LORAN-C FLIGHT TEST EVALUATION Final Report

Larry D. King and Edwin D. McConkey Washington FAA 12 May 1983 104 p refs

(Contract DTFA01-80-C-10080)

(FAA-PM-83-4) Avail: NTIS HC A06/MF A01

A Loran-C flight test program conducted in the State of Alaska is described. The purpose of the flight test was to identify applicable Loran-C accuracy data for the Alaskan air taxi and light aircraft operators so that a Supplemental Type Certificate (STC) can be issued in the Alaska Region for the Loran-C system tested (Teledyne TDL-711). Navigation system errors were quantified for the Loran-C unit tested. The errors were computed from knowledge of position calculated from ground truth data and the indicated position of the navigator. Signal coverage, bias and flight technical error data were also obtained. Multilateration ground truth, photographic ground truth, and data acquisition systems were carried aboard the test aircraft. Author

N83-24492# Pailen-Johnson Associates, Inc., McLean, Va.

FAILURE MODES, EFFECTS AND CRITICALITY ANALYSIS (FMECA) OF TYPE AN/GRN-27 (V) INSTRUMENT LANDING SYSTEM WITH TRAVELING-WAVE LOCALIZER ANTENNA Final Report

George Pappas and Ronald Pendleton Washington FAA Feb. 1983 142 p refs

(Contract DTFA01-82-Y-10537)

(DOT/FAA/PM-83/18) Avail: NTIS HC A07/MF A01

A Failure Modes, Effects and Criticality Analysis (FMECA) is used to determine, for the AN/GRN-27(V), the probability of radiation of a hazardous signal and the probability of a loss of signal. This analysis is based on the FMECA performed on the Texas instruments, incorporated Mark III ILS (Report No. FAA-RD-73-111), modified to reflect the differences between the Mark III and the GRN-27. The methodology considers the effects of all failures of functionally distinct circuits which can result in potentially hazardous failure modes. Possible modifications to operating procedures and equipment are considered with respect to meeting the proposed Level 3 and Level 4 reliability levels. The reliability resulting from such improvements is calculated and description of recommended improvements is included. Facility Maintenance Logs for the calendar year 1981 from GRN-27 facilities are analyzed and correlated with the theoretical calculations. Author

N83-24493# Federal Aviation Administration, Washington, D.C. Advanced Automation Program Office.

ADVANCED AUTOMATION SYSTEM (AAS) TRANSITION STRATEGY

Andres G. Zellweger Apr. 1983 40 p refs

(FAA-AP-83-1) Avail: NTIS HC A03/MF A01

The Advanced Automation System comprises all of the automation equipment required for Air Traffic Control at the Area Control Facilities and Air Traffic Control Towers to accommodate the ATC evolution of the 1990 - 2010 era. The strategy and supporting rationale for transitioning from today's automation system to the Advanced Automation System is described. The approach presented here forms the basis for much of the Advanced Automation Program planning and is reflected in the detailed transition, facility modernization, test, training and budget planning. S.L.

N83-24494# Burroughs Corp., Paoli, Pa. Federal and Special Systems Group.

SYSTEM DESCRIPTION FOR AUTOMATED RADAR TERMINAL AIR TRAFFIC CONTROL SYSTEM, ARTS 2 ENHANCEMENTS, REVISION A Final Report

Washington FAA 15 Oct. 1982 64 p refs

(Contract DTFA01-82-C-10008)

(FAA-PM-83-19-Rev-A) Avail: NTIS HC A04/MF A01

A system description of the ARTS IIA hardware and software is provided. The ARTS IIA is an expansion of the existing Automated Radar Terminal System (ARTS II). The expansion provides a safety package that includes beacon target tracking, minimum safe altitude warning and aircraft conflict alert. The warning and alert functions include the addition of an aural alarm and additional display data. An integrated target generator was added to provide test and training modes of operation. Data extraction and reduction functions were included to aid in the development testing. To provide for increased performance and memory capacity, the computer was upgraded and software developed. Except for the processor, all ARTS II hardware were retained. Brief descriptions of this hardware and the aural alarm unit are included. A description of the existing, modified and software functions and the system performance requirements are also presented. S.L.

N83-24495# Federal Aviation Administration, Atlantic City, N.J. Technical Center.

EVALUATION OF PRECISION APPROACH PATH INDICATOR (PAPI) Final Report, Jan. 1980 - Sep. 1982

Bret Castle Apr. 1983 80 p refs

(FAA-CT-82-153; FAA-RD-82-85) Avail: NTIS HC A05/MF A01

This report describes the evaluation of the Precision Approach Path Indicator (PAPI) to determine whether the PAPI provides sufficient advantages over the current standard red/white Visual Approach Slope Indicator (VASI) to warrant recommending it as the United States standard visual glidepath indicator. This process covered photometric testing, environmental testing, and flight evaluation. Various flight evaluations were accomplished at the FAA Technical Center (ACY), Newark Airport, New Jersey (EWR), Teterboro Airport, New Jersey (TEB), and at Bader Field in

Atlantic City, New Jersey (AIY). The results indicate that PAPI was preferred over the standard red/white VASI system. In general, United States pilots find very little fault with the standard red/white VASI system, and the PAPI is preferred mainly because it gives more rate and position information and because of its quick transitions from one color to the other. It is a passive system (no moving parts to wear out), meeting all of the operational requirements of a glide slope system, and requires less equipment and real estate than the standard VASI. Author

N83-24496# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
AUTOMATION OF THE DMA LIST OF LIGHTS AND RADIO NAVIGATIONAL AIDS
Morris F. Glenn 5 Apr. 1983 20 p
(AD-A124199) Avail: NTIS HC A02/MF A01 CSCL 17/7

The Defense Mapping Agency (DMA) has completed the software development required to automate the compilation, publication and maintenance of seven volumes of the DMA List of Lights and two volumes of the DMA Radio Navigational Aids. The List of Lights has been published by the United States Government since 1871 and the Radio Aids since 1925. Presently, both of these publications are completely produced by use of manual methods and files. Each of these publications has a long history of service to the fleet and are considered important navigational aids for all mariners. This paper provides a detailed overview of the software subsystem necessary to load, process and publish the List of Lights and Radio Aid data on the Automated Notice to Mariners System (ANMS) computer. The List of Lights software will share all of the ANMS hardware and communications capabilities. It will provide remote query capabilities for mariners at sea, digital data transmission potential for computer applications and, most important, the potential to produce an up-to-date edition of any annual volume at any time. Author (GRA)

N83-24497# Naval Surface Weapons Center, Dahlgren, Va.
LONG BASELINE (TRANSOCEANIC) SURVEYING USING THE GLOBAL POSITIONING SYSTEM AND ITS BROADCAST EPHEMERIS Final Report
Alan G. Evans and Bruce R. Hermann Sep. 1982 20 p refs
(AD-A123585; NSWC/TR-82-311) Avail: NTIS HC A02/MF A01 CSCL 17/7

Two Global Positioning System (GPS) receivers were used to simultaneously track GPS satellites on a very long baseline. The baseline was 8344 km and subtended an earth-centered arc of about 85 degrees. Due to the large distance separating the antennas and their location in the Southern Hemisphere, only two satellites of the present GPS constellation were able to be tracked simultaneously at both sites. The receiver antennas were placed over position markers with known absolute position accuracies of about 1 to 2 m. Doppler data and the satellite broadcast ephemerides were collected at both sites for a period of about a month. Weekly and daily estimates of the relative antenna positions were determined. The data were processed using linear least-squares procedures, which held one site fixed and estimated corrections to the assumed coordinates of the second. The baseline length was established with an error of less than 1 part per million (ppm). Author (GRA)

N83-24498# Coast Guard, Washington, D.C. Office of Research and Development.
HHE/LORAN-C SURVEYING Final Report
A. J. Sedlock Nov. 1982 334 p
(AD-A124343; USCG-D-54-82) Avail: NTIS HC A15/MF A01 CSCL 17/7

A methodolcgy was developed to provide calibration data for Loran-C navigators designed to be used in harbor, harbor entrance areas. Visual aids to navigation are used as a position reference whenever possible. An electronic positioning system is used when available visual aids to navigation are not satisfactory. The data acquisition system, data collection techniques and data analysis procedures have been field tested in New York Harbor, Delaware Bay and River and the St. Marys River (Michigan). The calibration points, waypoints, are calculated for each intersection of commonly used tracklines in a harbor area. Additional calibration points, termed track-points, are added as necessary to minimize position errors. A typical harbor with 20-30 waypoints can be surveyed over a two week period. A survey crew consists of three to five persons; a survey using only visual aids could be accomplished with as few as two. The survey data is analyzed in the field as the survey progresses to prevent the need to resurvey. This document provides a brief description of the data acquisition system, Time-Difference Survey System (TDSS); and a detailed description of data collection and data analysis procedures. (A complete description of the TDSS may be found in the Coast Guard Research and Development Center Report, 'Time Difference Survey System (TDSS)'). Improvements and expanded utilization to the TDSS is discussed. Also discussed is a technique analogous to a track plotter for user equipment self-calibration. GRA

N83-24499# Trans Systems Corp., Vienna, Va.
AN ANALYSIS OF REPORTS OF OPERATIONAL ERRORS Report, Jan. - Aug. 1982
Mallik Arjunan, E. J. Longstreet, and John C. H. Woo Aug. 1982 88 p
(Contract DTFA01-82-Y-30523)
(AD-A123416; TS-126; FAA-ASF-200-83-1) Avail: NTIS HC A05/MF A01 CSCL 12/1

The findings of the statistical analyses used to determine whether the level of safety performance within the air traffic control system was affected by the air traffic controllers' strike of August 1981 are presented. The analysis of the operational errors reported during specified periods before and after the August 3, 1981, strike provided statistical confirmation regarding the lack of degradation of national airway safety after the strike. The post-strike operational errors normalized to the volume of operations are shown to be lower than the normalized operational errors reported in the period prior to the strike. Author (GRA)

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-24500*# Analytical Mechanics Associates, Inc., Mountain View, Calif.
COMPUTER PROGRAMS FOR GENERATION AND EVALUATION OF NEAR-OPTIMUM VERTICAL FLIGHT PROFILES Final Report
John A. Sorensen, Mark H. Waters, and Leda C. Patmore Washington NASA May 1983 147 p refs
(Contract NAS1-15497)
(NASA-CR-3688; NAS 1.26:3688; AMA-82-39) Avail: NTIS HC A07/MF A01 CSCL 01C

Two extensive computer programs were developed. The first, called OPTIM, generates a reference near-optimum vertical profile, and it contains control options so that the effects of various flight constraints on cost performance can be examined. The second, called TRAGEN, is used to simulate an aircraft flying along an optimum or any other vertical reference profile. TRAGEN is used to verify OPTIM's output, examine the effects of uncertainty in the values of parameters (such as prevailing wind) which govern the optimum profile, or compare the cost performance of profiles generated by different techniques. A general description of these programs, the efforts to add special features to them, and sample results of their usage are presented. Author

N83-24501# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Div. Avions.
THE RETURN OF THE PROPELLER AIRPLANE [LE RETOUR DE L'AVION A HELICE]
D. Berger and P. Jacquet 1982 29 p In FRENCH Presented

12th Salon Aeron. et Spatial de Toulouse "Journees d'Aeronautiques 1982", Toulouse, 15-19 Jun. 1982 Sponsored by Assoc. Aeron. et Astronautique de France
(SNIAS-822-111-102) Avail: NTIS HC A03/MF A01

The cost of fuel, the properties of propellers, U.S. deregulation of domestic airlines, and the market for commuter and short-haul aircraft are reasons for renewed interest in propellers. The evolution of turbopropulsion technologies (propellers, gas generators, and soundproofing of fuselages) are increasing passenger comfort and reducing noise levels as well as fuel and maintenance costs. The results of research and studies by propeller, aircraft, and engine designers are manifested in new aircraft programs, in the American advanced turboprop project (propfan) financed by NASA, and in the French propellers for fast aircraft program. Transl. by A.R.H.

N83-24502# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A CRITIQUE OF THE BELL HELICOPTER TEXTRON COBRA 2.75 INCH ROCKET BALLISTIC ALGORITHM
Harold J. Breaux Jan. 1983 33 p refs
(DA Proj. 1H4-64202-DL-62)
(AD-A123703; ARBRL-TR-02463) Avail: NTIS HC A03/MF A01 CSCL 12/1

The ballistic algorithm currently implemented on the AH-1S (Modernized) Cobra Helicopter for the 2.75-inch MK 40 rocket system is of interest due to ongoing efforts involving the Mk 66 rocket system. Additional interest arises due to past unresolved controversies centering on the issue of the adequacy and correctness of the mathematical formulation. The question is examined by comparison of the Bell Helicopter Textron (BHT) algorithm with a simple free flight model derived from basic ballistic equations. The analysis indicated the omission of a significant drag effect in the elevation equation and the lack of any compensation for wind effects in free flight. The BHT algorithms is shown to be deficient in the formulation of a component term which compensates for the ballistic influence of helicopter velocity normal to the line of site. The general inaccuracy of the 2.75-inch rocket has previously masked any chance of detection of a systematic bias that might be due to a poor ballistic algorithm. The insight provided by this critique leads one to focus on hover firings where analysis predicts a bias should be more clearly evident. The test data provides a dramatic confirmation of the theoretical inferences which imply a 60 mil elevation error bias at maximum range. Author (GRA)

N83-24503# Aerospace Medical Research Labs., Wright-Patterson AFB, Ohio.
VISUAL JUDGMENTS OF OPTICAL DISTORTIONS IN AIRCRAFT WINDSCREENS Technical Report, 6 Oct. 1976 - 18 Jan. 1981
Herschel C. Self Oct. 1982 35 p
(AF Proj. 7184)
(AD-A124307; AFAMRL-TR-81-24) Avail: NTIS HC A03/MF A01 CSCL 01/3

Observer ratings of optical distortion in eleven F-111 Aircraft windscreens were examined using six factory production line visual quality inspectors, six Air Force pilots, all with years of flying experience, and two observers familiar with aircraft windscreen problems. Observers looked through the windscreens at large gridboards having thin white lines on a black background. Each windscreen was rated for effect of distortion on flying performance (yes-no), acceptability (yes-no), and for position on a 0-5 distortion scale for eight optical distortion variables: line splitting, line bending, line banding, shimmer, magnification, other distortions, and overall distortion. High correlations were found between types of distortion. Ratings on either banding or line bending, could be used to efficiently predict overall optical distortion. Pilots and visual quality inspectors were quite close in judgments of overall optical distortion and on specific types of distortion. Pilots rated distortions very slightly worse (higher), but were appreciably more likely to rate a windscreen as influencing pilot performance. Neither lens factor nor displacement grade, alone, were significantly related to acceptability or performance effects judgments. Author (GRA)

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-24504*# Honeywell, Inc., Minneapolis, Minn. Avionics Div.
DEMONSTRATION ADVANCED AVIONICS SYSTEM (DAAS). PHASE 1 REPORT Final Report
30 Apr. 1981 160 p refs Prepared in cooperation with King Radio Corp.
(Contract NAS2-10021)
(NASA-CR-170317; NAS 1.26:170317; N-151871) Avail: NTIS HC A08/MF A01

An integrated avionics system which provides expanded functional capabilities that significantly enhance the utility and safety of general aviation at a cost commensurate with the general aviation market is discussed. Displays and control were designed so that the pilot can use the system after minimum training. Functional and hardware descriptions, operational evaluation and failure modes effects analysis are included. S.L.

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-24505*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EFFECTS OF INTERSTAGE DIFFUSER FLOW DISTORTION ON THE PERFORMANCE OF A 15.41-CENTIMETER TIP DIAMETER AXIAL POWER TURBINE Final Report
Kerry L. McLallin, Milton G. Kofskey, and Kestutis C. Civinskas (Army Research and Technology Labs., Cleveland, Ohio) 1983 22 p refs Proposed for presentation at the 19th Joint Propulsion Conf., Seattle, 27-29 Jun. 1983; sponsored by AIAA, SAE, and ASME
(Contract DE-AI01-77CS-51040)
(NASA-TM-83359; DOE/NASA/51040-46; E-1621; NAS 1.15:83359; AVRADCOM-TR-83-C-2; AIAA-83-1179) Avail: NTIS HC A02/MF A01 CSCL 21E

The performance of a variable-area stator, axial flow power turbine was determined in a cold-air component research rig for two inlet duct configurations. The two ducts were an interstage diffuser duct and an accelerated-flow inlet duct which produced stator inlet boundary layer flow blockages of 11 percent and 3 percent, respectively. Turbine blade total efficiency at design point was measured to be 5.3 percent greater with the accelerated-flow inlet duct installed due to the reduction in inlet blockage. Blade component measurements show that of this performance improvement, 35 percent occurred in the stator and 65 percent occurred in the rotor. Analysis of inlet duct internal flow using an Axisymmetric Diffuser Duct Code (ADD Code) were in substantial agreement with the test data. Author

N83-24506*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
OPPORTUNITIES FOR RESEARCH IN AEROTHERMODYNAMICS
Robert W. Graham 1983 25 p refs Presented at the Meeting of the Thermosci. Affiliates of Stanford Univ., Stanford, Calif., 24 Jan. 1983
(NASA-TM-83348; E-1605; NAS 1.15:83348) Avail: NTIS HC A02/MF A01 CSCL 21E

'Aerothermodynamics' involves the disciplines of chemistry, thermodynamics, fluid mechanics and heat transfer which have collaborative importance in propulsion systems. There are growing opportunities for the further application of these disciplines to improve the methodology for the design of advanced gas turbines; particularly, the combustor and turbine. Design procedures follow empirical or cut and try guidelines. The tremendous advances in computational analysis and in instrumentation techniques hold promise for research answers to complex physical processes that are currently not well understood. The transfer of basic research understanding to engineering design should result in shorter, less expensive development commitments for engines. The status and anticipated opportunities in research topics relevant to combustors and turbines is reviewed. S.L.

N83-24507*# Texas A&M Univ., College Station. Turbomachinery Labs.
DEFINITION OF FORCES ON TURBOMACHINERY ROTORS. TASK B REPORT: DYNAMIC ANALYSIS OF ROTORS
Dara W. Childs 1 May 1983 105 p refs
(Contract NAS8-34505)
(NASA-CR-170763; NAS 1.26:170763; RD-2-83) Avail: NTIS HC A06/MF A01 CSCL 21E

The rotordynamic characteristics of turbomachinery are known to depend on the forces developed due to relative motion between the rotor and the housing. For example, the critical speed locations generally depend on the bearing stiffnesses, seal dampling influences rotor stability and bearing reaction amplitudes near critical speeds, etc. A systematic examination of the influence of changes in the forces acting on rotors is studied. More specifically, the sensitivity of the rotordynamic characteristics to changes in rotor forces is analyzed. Rotordynamic characteristics of the HPOTP (High Pressure Oxygen Turbopump) and HPFTP (High Pressure Fuel Turbopump) of the SSME (Space Shuttle Main Engine) are investigated. Because of their markedly different rotordynamic characteristics, these units are considered to be representative of a range of possible future liquid rocket engine turbomachinery. Author

N83-24508# National Aerospace Lab., Tokyo (Japan).
RESEARCH AND DEVELOPMENT OF THE TURBOFAN ENGINE (THE 2ND PHASE, FJR 710)
1982 82 p In JAPANESE; ENGLISH summary
(NAL-TR-741; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

A 5 ton thrust class turbofan engine, the prototype FJR 710/600 turbofan engine was developed. Details on individual component tests and engine test runs are provided. S.L.

N83-24509*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PARTICLE SIZING BY MEASUREMENT OF FORWARD-SCATTERED LIGHT AT TWO ANGLES
Donald R. Buchele May 1983 25 p refs
(NASA-TP-2156; E-1179; NAS 1.60:2156) Avail: NTIS HC A02/MF A01 CSCL 20F

Fundamental and practical limitations to particle sizing by measurement of forward scattered light are presented. Methods to minimize the limitations are described. Two types of instruments are compared. Author

N83-24510# Dayton Univ., Ohio.
PROCEEDINGS: EJECTOR WORKSHOP FOR AEROSPACE APPLICATIONS Final Technical Report, Aug. 1981 - Jan. 1982
Richard P. Braden, R. S. Nagaraja, and H. J. P. vonChain Wright-Patterson AFB, Ohio AFWAL Jun. 1982 1050 p refs Workshop held in Dayton, Ohio, 2-5 Aug. 1981
(Contract F33615-81-K-3032; AF Proj. 2307)
(AD-A124264; UDR-TR-82-64; AFWAL-TR-82-3059) Avail: NTIS HC A99/MF A01 CSCL 21/5

These are the Proceedings of the Ejector Workshop for Aerospace Applications, which was conducted 2-5 August 1981 at the Bergamo Conference Center, Dayton, Ohio. The Workshop was hosted by the Air Force Office of Scientific Research and the Flight Dynamics and Aeropropulsion Laboratories of the Air Force Wright Aeronautical Laboratories. GRA

N83-24511# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
ROUGHNESS EFFECTS ON COMPRESSOR OUTLET GUIDE VANES AT HIGH REYNOLDS NUMBER AND HIGH TURNING ANGLE M.S. Thesis
David Taylor Genovese Nov. 1982 95 p refs
(AD-A124688; AFIT/GAE/AA/82D-11) Avail: NTIS HC A05/MF A01 CSCL 21/5

An experimental investigation of the effects of surface roughness on flow at high Reynolds number over compressor outlet guide vanes at high turning angle in a 2-D cascade was conducted. Two models of roughness were tested: one smoother and one rougher than actual compressor vanes. Four configurations of roughness were evaluated: pressure and suction sides smooth, pressure and suction sides rough, pressure side rough with the suction side smooth and suction side rough with the pressure side smooth. GRA

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-24512*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
RIDE QUALITY SYSTEMS FOR COMMUTER AIRCRAFT Final Report
David R. Downing, Terry A. Hammond, and Shailesh P. Amin Hampton, Va. NASA. Langley Research Center May 1983 92 p refs
(Grant NAG1-282)
(NASA-CR-166118; NAS 1.26:166118; KU-FRL-582-1) Avail: NTIS HC A05/MF A01 CSCL 01C

The state-of-the-art in Active Ride Augmentation, specifically in terms of its feasibility for commuter aircraft applications. A literature survey was done, and the principal results are presented here through discussion of different Ride Quality Augmentation System (RQAS) designs and advances in related technologies. Recommended follow-on research areas are discussed, and a preliminary RQAS configuration for detailed design and development is proposed. Author

N83-24513*# Calspan Advanced Technology Center, Buffalo, N.Y.
APPLICATION OF CALSPAN PITCH RATE CONTROL SYSTEM TO THE SPACE SHUTTLE FOR APPROACH AND LANDING Final Report
Norman C. Weingarten and Charles R. Chalk May 1983 145 p refs
(Contract NAS4-2995)
(NASA-CR-170402; NAS 1.26:170402; Rept-7102-F-1) Avail: NTIS HC A07/MF A01 CSCL 01C

A pitch rate control system designed for use in the shuttle during approach and landing was analyzed and compared with a revised control system developed by NASA and the existing OFT control system. The design concept control system uses filtered pitch rate feedback with proportional plus integral paths in the forward loop. Control system parameters were designed as a function of flight configuration. Analysis included time and frequency domain techniques. Results indicate that both the Calspan and NASA systems significantly improve the flying qualities of the shuttle over the OFT. Better attitude and flight path control and less time delay are the primary reasons. The Calspan system is preferred because of reduced time delay and simpler mechanization. Further testing of the improved flight control systems in an in-flight simulator is recommended. A.R.H.

N83-24514# National Aerospace Lab., Tokyo (Japan).
REAL TIME DIGITAL INTERGRATION AND INTEGRAL STEP SIZE FOR FLIGHT CONTROL AND FLIGHT SIMULATION
Akira Watanabe 1982 45 p refs In JAPANESE; ENGLISH summary
(NAL-TR-743; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

Digital computers were adopted for aircraft inner loop control functions and for flight simulators used in aircraft design, analysis and training. In these systems, digital computers are used in most cases as a device for executing real time calculations. A digital computer has the following merits: it can easily execute most calculations including nonlinearities; it is easy to improve the computational accuracy; it has reproducibility; and it has good ability of memory. For a real time execution using digital computers, the fundamental problem is one of numerical integration. Many methods and techniques for performing these integrations were revised. Various integration methods which are effective for real time calculations are compared. It is further pointed out that in actual execution, it is important to choose an integral step size (or sampling rate) that the system can accommodate. Then, in the last section sampling rate selection methods are discussed. Author

N83-24515*# Lockheed-Georgia Co., Marietta.
INTEGRATED ASSURANCE ASSESSMENT OF A RECONFIGURABLE DIGITAL FLIGHT CONTROL SYSTEM Final Report, Feb. - Oct. 1982
W. G. Ness, R. M. Davis, J. W. Benson, M. K. Smith, and D. Eldredge Washington FAA Apr. 1983 125 p refs
(Contracts NAS2-11179; DOT-FA77WAI-738)
(NASA-CR-170281; NAS 1.26:170281) Avail: NTIS HC A06/MF A01 CSCL 01C

The integrated application of reliability, failure effects and system simulator methods in establishing the airworthiness of a flight critical digital flight control system (DFCS) is demonstrated. The emphasis was on the mutual reinforcement of the methods in demonstrating the system safety. Author

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-24516*# Fairchild Weston Systems, Inc., Sarasota, Fla.
THE DOE/NASA WIND TURBINE DATA ACQUISITION SYSTEM. PART 3: UNATTENDED POWER PERFORMANCE MONITOR
A. Halleyy, D. Heidkamp, H. Neustadter, and R. Olson Jan. 1983 63 p refs Sponsored in part by DOE
(Contract DEN3-98)
(NASA-CR-165540; NAS 1.26:165540; FWS-7621) Avail: NTIS HC A04/MF A01 CSCL 14B

Software documentation, operational procedures, and diagnostic instructions for development version of an unattended wind turbine performance monitoring system is provided. Designed to be used for off line intelligent data acquisition in conjunction with the central host computer. S.L.

N83-24517# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.
EXPERIMENTAL TESTS ON ACCELEROMETERS AND PRESSURE TRANSDUCERS FOR CRYOGENIC WIND-TUNNEL MODELS
S. Luck Sep. 1982 22 p refs Presented at the ETW Cryogenic Technol. Rev. Meeting, Amsterdam, 15-17 Sep. 1982
(N/FE123/S/PUB/77) Avail: NTIS HC A02/MF A01

The function of accelerometers and pressure transducers in simulated conditions was shown, and demonstration of probes which might be used. Author

N83-24518# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Unternehmensbereich Flugzeuge.
PARAMETER AND DESIGN STUDIES FOR THE USE OF WIND TUNNEL MODELS IN THE ETW
A. Zacharias Sep. 1982 13 p refs Presented at the ETW Cryogenic Rev. Meeting, Amsterdam, 15-17 Sep. 1982
(MBB/FE123/S/PUB/83) Avail: NTIS HC A02/MF A01

The boundary conditions and the design criteria for cryogenic wind tunnel models were analysed for a Tornado model in terms of their experimental and design problems. Some fundamental relationships concerning fluid mechanics for cryogenic wind tunnels, as well as several experimental and model related considerations were summarized as formulae. Author

N83-24519# National Aerospace Lab., Amsterdam (Netherlands).
PEANUTS - THE PETW DATA SYSTEM
P. H. Fuijkschot Sep. 1982 14 p Presented at the ETW Cryogenic Technol. Rev. Meeting, Amsterdam, 15-17 Sep. 1982
(MAW-82-009-U) Avail: NTIS HC A02/MF A01

PEANUTS is centered around an HP-1000 computer system with 128 k words of RAM and 20 Mbyte of disc storge. The National Aerospace Laboratory (NLR) designed front end equipment includes a digital 10 bus interface, 16 low level channels using 'Conditioning Units', an operator control panel, a Scanivalve controller and a 50 channel relay scanner. For temperature measurements with type T thermocouples a high precision unit with 60 Peltier cooled ice point reference junctions is available. The software for data acquisition is a proven NLR package with provisions for a monitoring loop and real time display of computed values. Measured data are stored in well defined files, while the subsequent processing is primarily the responsibility of TG-ETW (Technical Group-European Transonic Wind Tunnel). Author

N83-24520# National Aerospace Lab., Amsterdam (Netherlands). Technical Services Div.
DEVELOPMENT OF A NON-INSULATED CRYOGENIC STRAIN-GAUGE BALANCE
T. J. Schoenmakers [1982] 26 p Presented at the Cryogenic Technol. Rev. Meeting of ETW, 15-17 Sep. 1982, Amsterdam
(M-TP-82-006-U) Avail: NTIS HC A03/MF A01

Measurement of aerodynamic forces in the European Transonic Wind tunnel (ETW) is done with strain gage balances. The low and transient temperatures in this wind tunnel necessitate either to keep the balances at room temperature (heating and insulation) or to develop special balances for cryogenic circumstances (noninsulated). Experiments leading to the development of a three component cryogenic strain gage balance is reviewed discussed briefly. Author

N83-24521# Federal Aviation Administration, Washington, D.C.
NATIONAL AIRSPACE SYSTEM PLAN, FACILITIES, EQUIPMENT AND ASSOCIATED DEVELOPMENT
Dec. 1981 449 p
Avail: NTIS HC A19/MF A01

After an intensive 10-month review of the National Airspace System, the Federal Aviation Administration has charted a comprehensive plan for modernizing and improving air traffic control and airway facilities services from now to the year 2000. The plan addresses the compelling problems of how best to accommodate spiraling demands for aviation services, constrain costs, recast the required technical framework, and deal with aging facilities. Author

N83-24522# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Flugzeuge.
BASIC INVESTIGATIONS FOR THE USE OF WIND TUNNEL MODELS IN THE ETW Final Report, Sep. 1981
Heinz Hoenlinger, Stephan Luck, and Dieter Schimanski Bonn Bundesministerium fuer Forschung und Technologie Dec. 1982 49 p refs Sponsored by Bundesministerium fuer Forschung und

Technologie
(BMFT-FB-W-82-023; MBB/FE123/S/STY/0042;
ISSN-0170-1339) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

The use of wind tunnel models at cryogenic temperatures places new demands on the equipment, instruments and methods of construction applied hitherto. Their suitability is examined and recommendations are derived which should be observed in building and instrumenting wind tunnel models for cryogenic testing. In addition, methods are pointed out which allow, with some degree of convenience, an economical test procedure suited to the ETW. The report is divided into three main subjects. Author

N83-24523# Denver Research Inst., Colo. Social Systems Research and Evaluation Div.
RELATIVE COST AND TRAINING EFFECTIVENESS OF THE 6883 F-111 CONVERTER/FLIGHT CONTROL SYSTEM SIMULATORS AS COMPARED TO ACTUAL EQUIPMENT Final Report
Louis F. Cicchinelli, Kenneth R. Harmon, and Robert A. Keller Lowry AFB, Colo. Air Force Human Resources Lab. Dec. 1982 125 p refs
(Contract F33615-78-C-0018; AF Proj. 2361)
(AD-A123534; AFHRL-TR-82-30) Avail: NTIS HC A06/MF A01 CSCL 09/2

The objective of this study was to design and implement a comprehensive comparative cost and training effectiveness evaluation of (a) a Converter/Flight Control (6883) three dimensional simulator, (b) a 6883 two dimensional simulator, and (c) an actual 6883 test station. In addition, the broader issues of training objectives, role(s) of the simulators in training, user acceptance, and the training environment were investigated as related to the expanded simulators for delivering maintenance training in the Air Force. Author (GRA)

N83-24524# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.
AN EVALUATION OF THE PAVEMENT CONDITION INDEX PREDICTION MODEL FOR RIGID AIRFIELD PAVEMENTS M.S. Thesis
William L. Goetz and Nelson O. Perez-Otero Sep. 1982 209 p refs
(AD-A123002; AFIT-LSSR-64-82) Avail: NTIS HC A10/MF A01 CSCL 13/2

The United States Army Corps of Engineers, Construction Engineering Research Laboratory (CERL) has been working for several years on the development of an airfield pavement maintenance management system. As an integral element to this system, Pavement Condition Index (PCI) prediction models have been formulated for rigid flexible pavements. The purpose of this thesis was to evaluate the PCI prediction model for rigid Air Force airfield pavements. The model was tested using a new data base, from which it was determined that the predicted PCI values correlated fairly closely with the actual measured PCI values. The model was determined to be a reasonable predictor of the condition of rigid airfield pavements. GRA

N83-24889*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CONTROL OF LARGE THERMAL DISTORTIONS IN A CRYOGENIC WIND TUNNEL
John C. Gustafson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 121-142 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 14B

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-24525* National Aeronautics and Space Administration, Washington, D. C.
TECHNOLOGY FOR LARGE SPACE SYSTEMS: A BIBLIOGRAPHY WITH INDEXES
Jan. 1983 96 p
(NASA-SP-7046(07); NAS 1.21:7046(07)) Avail: NTIS HC A05/MF A01 CSCL 22A

This bibliography lists 366 reports, articles and other documents introduced into the NASA scientific and technical information system between January 1, 1982 and June 30, 1982. Subject matter is grouped according to systems, interactive analysis and design, structural concepts, control systems, electronics, advanced materials, assembly concepts, propulsion, solar power satellite systems, and flight experiments. A.R.H.

N83-24526*# General Dynamics/Convair, San Diego, Calif. Advanced Space Programs.
SPACE CONSTRUCTION EXPERIMENT DEFINITION STUDY (SCEDS), PART 3. VOLUME 1: EXECUTIVE SUMMARY Final Report
Mar. 1983 28 p 2 Vol.
(Contract NAS9-16303)
(NASA-CR-171661; NAS 1.26:171661; GDC-ASP-83-007) Avail: NTIS HC A03/MF A01 CSCL 22A

Study tasks were directed toward definition of an early shuttle controls and dynamics flight experiment, as well as evolutionary or supplemental experiments, that address the needs of the dynamics and controls community and demonstrates the shuttle system capability to perform construction operations. A requirement that the first bending mode of the SCE be above 0.15 Hertz to avoid coupling with the DAP was adopted. S.L.

N83-24527*# General Dynamics/Convair, San Diego, Calif. Advanced Space Programs.
SPACE CONSTRUCTION EXPERIMENT DEFINITION STUDY (SCEDS), PART 3. VOLUME 2: STUDY RESULTS Final Report
Mar. 1983 98 p 2 Vol.
(Contract NAS9-16303)
(NASA-CR-171660; NAS 1.26:171660; GDC-ASP-83-006) Avail: NTIS HC A05/MF A01 CSCL 22A

The essential controls and dynamics community needs for a large space structures is addressed by the basic Space Construction Experiments (SCE)/MAST configuration and enhanced configurations for follow-on flights. The SCE/MAST can be integrated on a single structures technology experiments platform (STEP). The experiment objectives can be accomplished without the need for EVA and it is anticipated that further design refinements will eliminate the requirement to use the remote manipulator system. Author

N83-24528*# National Aeronautics and Space Administration, Washington, D. C.
THE SPACE TECHNOLOGY DEMAND ON MATERIALS AND PROCESSES
J. Dauphin Mar. 1983 23 p refs Transl. into ENGLISH from L'Aeronautique et L'Astronautique (France), no. 91, 1981 p 39-46 Original language document was announced as A82-19944 Transl. by Scientific Translation Service, Santa Barbara, Calif.
(Contract NASw-3542)
(NASA-TM-77041; NAS 1.15:77041) Avail: NTIS HC A02/MF A01 CSCL 22A

Space technology requires a rational and accurate policy of materials and processes selection. This paper examines some areas of space technology where materials and process problems have occurred in the past and how they can be solved in the future. Author

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

N83-24529*# Dynetics, Inc., Huntsville, Ala.
ASCENT TRAJECTORY DISPERSION ANALYSIS Final Report

Dec. 1982 276 p refs
(NAS8-34431)
(NASA-CR-170741; NAS 1.26:170741; TR82-MSFC-34431-048)
Avail: NTIS HC A13/MF A01 CSCL 22A

The results of a Space Transportation System ascent trajectory dispersion analysis are documented. Critical trajectory parameter values useful for the definition of lightweight external tank insulation requirements are provided. This analysis was conducted using two of the critical missions specified for the Space Transportation System: a 28.5 deg inclination trajectory launched from the Eastern Test Range (ETR) and a Western Test Range (WTR) trajectory launched into a 104 deg orbital inclination. Author

N83-24530# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DETERMINATION OF ARTIFICIAL SATELLITE ATTITUDE BY ESTIMATES OF STATE M.S. Thesis - 16 Apr. 1982 [DETERMINACAO DE ATITUDE DE SATELITES ARIFICIAIS ATRAVES DE ESTIMADORES DE ESTADO]
Roberto Vieira da Fonseca Lopes Dec. 1982 110 p refs In PORTUGUESE, ENGLISH summary
(INPE-2608-TDL/105) Avail: NTIS HC A06/MF A01

A basic procedure to estimate the attitude of Earth artificial satellites is developed and tested. Initially, topics related with attitude determination and control, needed in the problem formulation, are analyzed. Techniques to compensate for dynamic modelling and to treat adaptively the state noise are used, in the estimation procedure, together with the extended Kalman filter. The real attitude of two artificial satellites, simulated in a digital computer, was used to test the procedure's performance. The results allow one to draw preliminary conclusions about the use of the procedure in the attitude determination software of the two initial satellites of the Brazilian Complete Space Mission. Author

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

N83-24531*# Aeronautical Research Associates of Princeton, Inc., N. J.
RANGE SAFETY SIGNAL ATTENUATION BY THE SPACE SHUTTLE MAIN ENGINE EXHAUST PLUMES Report, 27 Aug. 1982 - 25 Jan. 1983
Blaine E. Pearce 19 Apr. 1983 37 p refs
(Contract NAS8-34956)
(NASA-CR-170760; NAS 1.26:170760; ARAP-494) Avail: NTIS HC A03/MF A01 CSCL 14B

An analysis of attenuation of the range safety signal at 416.5 MHz observed after SRB separation and ending at hand over to Bermuda, during which transmission must pass through the LOX/H2 propelled main engine exhaust plumes, is summarized. Absorption by free electrons in the exhaust plume can account for the nearly constant magnitude of the observed attenuation during this period; it does not explain the short term transient increases that occur at one or more times during this portion of the flight. It is necessary to assume that a trace amount (about 0.5 ppm) of easily ionizable impurity must be present in the exhaust flow. Other mechanisms of attenuation, such as scattering by turbulent fluctuations of both free and bound electrons and absorption by water vapor, were examined but found to be inadequate to explain the observations. S.L.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-24532* National Aeronautics and Space Administration, Washington, D. C.
EUROPEAN X-RAY OBSERVATORY SATELLITE (EXOSAT)
12 May 1983 12 p
(NASA-News-Release-83-74; P83-10085) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 22A

Initially planned to be launched on the Ariane L6, the 510 kilogram European X-Ray Observatory Satellite (EXOSAT) is to be placed into orbit from Space Launch Complex 2 West by NASA's Delta 3914 launch vehicle. Objectives of the mission are to study the precise position, structure, and temporal and spectral characteristics of known X-ray sources as well as search for new sources. The spacecraft is described as well as its payload, principal subsystems, and the stages of the Delta 3914. The flight sequence of events, land launch operations are discussed. The ESA management structure for EXOSAT, the NASA/industry team, and contractors are listed. A.R.H.

N83-24533# National Aerospace Lab., Tokyo (Japan).
EFFECTS OF SMALL THRUST ON THE MOTION OF AN ARTIFICIAL EARTH SATELLITE
Sumio Takeuchi 1982 20 p refs In JAPANESE; ENGLISH summary
(NAL-TR-744; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Perturbative effects of small thrust on the motion of an artificial Earth satellite are investigated. The Lagrange planetary equations in Gaussian form are applied to determine the variations of the orbital elements. Also, equations of motion expressed in terms of different components of the thrust acceleration are used. It is assumed that the small thrust acceleration is a function of time and expressible as a linear combination of a polynomial and a composite set of all sines and cosines. By the method of linear perturbations the equations are solved and the perturbative effects on satellite orbital elements are obtained. The terms in variations of orbital elements are of three types. They are purely secular, periodic, and mixed secular types. Considering the gravitational disturbing function of the Earth and the luni-solar disturbing function to deal with the combined effect, the theory is applied to the orbit of the geostationary satellite. Then the variations of orbital elements, the longitude, the latitude, and the height based on the standard Earth-ellipsoid are calculated. In addition, the method of determining the components of the thrust that maintains the longitude and the latitude of the satellite within a given tolerance band about a prespecified station is discussed. M.G.

N83-24534# National Aerospace Lab., Tokyo (Japan).
ATMOSPHERIC DRAG EFFECTS ON THE MOTION OF AN ARTIFICIAL EARTH SATELLITE
Sumio Takeuchi 1982 17 p refs In JAPANESE; ENGLISH summary
(NAL-TR-748; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Perturbative effects of atmospheric drag on the motion of an artificial Earth satellite are investigated in this paper. The atmosphere is considered to rotate with the same angular velocity as the Earth. The altitudes of the satellite are given with reference to the standard Earth-ellipsoid. The Lagrange planetary equations in Gaussian form are applied to determine the variations of the orbital elements. The atmospheric density at the satellite is regarded as a function of time. The density function is approximated by polynomials determined by the least-squares method. The coefficients are calculated from the finite set of ordinates corresponding to the density values computed by analytically evaluating the 1971 Jacchia density model. By use of the osculating orbital elements the position of the satellite is predicted. In this case it is assumed that the orbit of the satellite is perturbed by

the variations of the Earth's gravitational field alone. The ratio of the rate of the Earth's rotation and the mean motion of the satellite is usually less than 1/10. This ratio and the eccentricity of the orbit are considered to be of the first order. In the expression of the magnitude of the relative velocity of the satellite with respect to the atmosphere, terms up to the third order are included. B.W.

N83-24535# Emmanuel Coll., Boston, Mass.
THE PLASMA EXPERIMENT ON BOARD METEOSAT-F2
A. Huber, J. Pantazis, D. R. Parsignault, P. L. Rothwell (AFGL), A. D. Johnstone, and G. L. Wrenn Aug. 1982 30 p refs Prepared in cooperation with University College, London
(Contract F19628-82-K-0039; AF Proj. 7601)
(AD-A123377; SR-1; AFGL-TR-82-0276) Avail: NTIS HC A03/MF A01 CSCL 20/3

An electron spectrometer has been designed to aid in the study of spacecraft charging on METEOSAT-F2. Differential energy analysis is performed by a pair of electrostatic analyzers (ESA) in which a time-sequenced variable electrostatic field deflects electrons of selected energies toward an exit aperture where they are counted by Channeltron Electron Multipliers (CEM). The small ESA covers energies ranging from 50 eV to 1 keV to 20 keV. The dwell time at each energy level is 98 ms, with both analyzers operating simultaneously. A complete 16 point spectrum is produced once per second and the 16 data words are transferred to the satellite on command. Author (GRA)

N83-24536# Analytic Decisions, Inc., Hawthorne, Calif.
INFRARED SATELLITE TECHNOLOGY STUDY Final Report, Mar. 1979 - Dec. 1982
1 Dec. 1982 88 p
(Contract F04701-79-C-0052)
(AD-A123631; OGU-011-82) Avail: NTIS HC A05/MF A01 CSCL 22/1

This is the final report of a support program under which an assessment and evaluation of infrared sensor technology was made, a technology program plan for measurement programs supporting missile surveillance technologies was developed, and technical and programmatic support was provided for ongoing and planned measurement programs. The technology assessment included focal plane, spectral filter, optics, cooling and onboard signal processing subsystems for space-based surveillance systems. The measurements program support included methodology development for program evaluation, review and analysis of Air Force and other-agency measurement programs and studies of the implications of advanced surveillance system concepts for measurement programs. Author (GRA)

N83-24882*# Martin Marietta Corp., Denver, Colo.
TETHERED SATELLITE CONTROL MECHANISM
Gilbert M. Kyrias *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 1-18 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24886*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE LINEAR BOOM ACTUATOR DESIGNED FOR THE GALILEO SPACECRAFT
Edgar F. Koch *In its* The 17th Aerospace Mech. Symp. May 1983 p 81-96 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24890*# National Space Development Agency, Ibaraki (Japan).
EVALUATION OF SCANNING EARTH SENSOR MECHANISM ON ENGINEERING TEST SATELLITE 4
Masami Ikeuchi, Yasufumi Wakabayashi, Yoshiaki Ohkami (National Aerospace Lab.), Takashi Kida (National Aerospace Lab.), Takeo Ishigaki (Matsushita Research Inst.), and Mikio Matsumoto (Matsushita Research Inst.) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 143-156 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24892*# Fairchild Space and Electronics Co., Germantown, Md.
A HIGH STRENGTH, TORSIONALLY RIGID, DEPLOYABLE AND RETRACTABLE MAST FOR SPACE APPLICATIONS
Lamont DiBiasi and Richard Kramer *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 171-180 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24895*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NUTATION DAMPER SYSTEM
Donald R. Sevilla *In its* The 17th Aerospace Mech. Symp. May 1983 p 209-226 ref (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 03A

N83-24897*# Martin Marietta Corp., Denver, Colo.
THE MANNED MANEUVERING UNIT FLIGHT CONTROLLER ARM
Ken E. Falkner *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 245-252 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-24537*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Missile Systems Div.
HIGH-SPEED MACHINING OF SPACE SHUTTLE EXTERNAL TANK (ET) PANELS Final Report
Joseph A. Miller 15 Apr. 1983 171 p
(Contract NAS8-34508)
(NASA-CR-170751; NAS 1.26:170751; LMSC-D-059404) Avail: NTIS HC A08/MF A01 CSCL 22B

Potential production rates and project cost savings achieved by converting the conventional machining process in manufacturing shuttle external tank panels to high speed machining (HSM) techniques were studied. Savings were projected from the comparison of current production rates with HSM rates and with rates attainable on new conventional machines. The HSM estimates were also based on rates attainable by retrofitting existing conventional equipment with high speed spindle motors and rates attainable using new state of the art machines designed and built for HSM. S.L.

N83-24538*# Chrysler Corp., New Orleans, La. Structures and Mechanics Dept.
PRESSURE SCALED WATER IMPACT TEST OF A 12.5 INCH DIAMETER MODEL OF THE SPACE SHUTTLE SOLID ROCKET BOOSTER Final Report
Oct. 1982 83 p refs
(Contract NAS8-33879)
(NASA-CR-170761; NAS 1.26:170761; TN-SM-82-9) Avail: NTIS HC A05/MF A01 CSCL 22B

A total of 59 tail first drops were made. Model entry conditions simulated full scale vertical velocities of approximately 75 to 110 ft/sec with horizontal velocities up to 45 ft/sec and impact angles to + or - 10 deg. These tests were conducted at scaled atmospheric pressures (1.26 psia or 65 mm.Hg). The model, test program, test facility, test equipment, instrumentation system, data reduction procedures, and test results are described. A.R.H.

N83-24539*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
STS-2, -3, -4 INDUCED ENVIRONMENT CONTAMINATION MONITOR (ICEM) Summary Report
E. R. Miller, ed. Feb. 1983 107 p refs
(NASA-TM-82524; NAS 1.15:82524) Avail: NTIS

HC A06/MF A01 CSCL 22B

The second, third, and fourth space transportation system missions are described including the location of the IECM in the payload bay and the shuttle coordinate systems used. Measurement results from the three flights are given for each instrument with comparisons to original goals for preflight environment and induced environment contamination. These results include very low levels of molecular mass accumulation rates, absence of molecular films on optical samples, outgassing species above 50 amu undetectable generally low levels of on-orbit particulates, and decay rates for early mission water dump particulates. Results of exposure of several optical materials and coatings to atomic oxygen are also presented. From these results, it is concluded that the space shuttle met the established induced environment contamination goals.

Author

N83-24540# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

A TRANSPORTATION MODEL FOR A SPACE COLONIZATION AND MANUFACTURING SYSTEM: A Q-GERT SIMULATION M.S. Thesis

Lynn Arthur Wagner, Jr. Dec. 1982 149 p refs

(AD-A124685; AFIT/GSO/OS/82D-6) Avail: NTIS HC A07/MF A01 CSCL 09/2

A computer simulation model of a transportation system for a hypothetical Space Colonization and Manufacturing System (SCMS) was developed to show how the transportation system will possibly function. The model, written in Q-GERT, a simulation languages which allows a graphical presentation of the system, could be modified to experiment with different transportation strategies. While the SCMS is based mostly on current information, it is very likely that an entirely different system will eventually be developed. With this being the case, the main objective was not to just build a model for a particular system but to illustrate a methodology which could be used with another system. The SCMS consists of six facilities in different orbits: three situated at Lagrangian points of the Earth-Moon system and the other three in low Earth orbit, geostationary Earth orbit, and low lunar orbit. The main activities of the SCMS are to build space colonies, to build Satellite Solar Power Stations, and to process lunar and asteroidal ore. The major component of the transportation system is the Inter-Orbital Shuttle which moves goods between the points in the SCMS and is unloaded, serviced, and loaded at each of the facilities.

Author (GRA)

N83-24899*# Sperry Flight Systems, Phoenix, Ariz.

THE DESIGN AND DEVELOPMENT OF A MOUNTING AND JETTISON ASSEMBLY FOR THE SHUTTLE ORBITER ADVANCED GIMBAL SYSTEM

Edward S. Korzeniowski *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 267-287 (For primary document see N83-24881 14-39)

Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24900*# Planning Research Corp., Kennedy Space Center, Fla.

ROLLING BEAM UMBILICAL SYSTEM

Bemis C. Tatem, Jr. *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 289-304 (For primary document see N83-24881 14-39)

Avail: NTIS HC A17/MF A01 CSCL 22B

N83-24906*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.

PAYLOAD RETENTION FITTINGS FOR SPACE SHUTTLE PAYLOAD GROUND HANDLING MECHANISM

Vincent Cassisi *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 375-391 (For primary document see N83-24881 14-39)

Avail: NTIS HC A17/MF A01 CSCL 22B

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-24541*# Bendix Corp., Teterboro, N. J. Guidance Systems Div.

MODULAR DESIGN ATTITUDE CONTROL SYSTEM Final Report, 16 Oct. 1981 - 31 Oct. 1982

F. D. Chichester 18 Mar. 1983 65 p refs

(Contract NAS8-33979)

(NASA-CR-170736; NAS 1.26:170736) Avail: NTIS HC A04/MF A01 CSCL 22B

Application of modular control techniques to the attitude control of a prototype flexible spacecraft and a prototype flexible space platform was further developed by determining numerical values for the physical parameters of a four body approximation of the MSFC/hybrid deployable truss incorporated in the space platform model, generating sensitivity coefficients for the model of the flexible spacecraft, evaluating the changes in the digital computer simulation of the flexible spacecraft resulting from the addition of another rigid body to the model and comparing attitude control effectiveness with actuators on more than one rigid body of the model with that for the case in which the actuators were restricted to one body.

Author

N83-24542*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

FLOW RATE/PRESSURE DROP DATA GATHERED FROM TESTING A SAMPLE OF THE SPACE SHUTTLE STRAIN ISOLATION PAD (SIP): EFFECTS OF AMBIENT PRESSURE COMBINED WITH TENSION AND COMPRESSION CONDITIONS

R. Dean Springfield and Pierce L. Lawing May 1983 44 p refs

(NASA-TM-84591; NAS 1.15:84591) Avail: NTIS HC A03/MF A01 CSCL 22B

Tests were conducted on a sample of strain isolation pad (SIP) typical of that used in the shuttle orbiter thermal protection system to determine the characteristics of SIP internal flow. Data obtained were pressure drop as a function of flow rate for a range of ambient pressures representing various points along the Shuttle trajectory and for stretched and compressed conditions of the SIP. Flow was in the direction of the weave parallel to most of the fibers. The data are plotted in several standard engineering formats in order to be of maximum utility to the user. In addition to providing support to the Space Shuttle Program, these data are a source of experimental information on flow through fiberous (rather than the more usual sand bed type) porous media. S.L.

N83-24543*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.

ON PARAMETER IDENTIFICATION FOR LARGE SPACE STRUCTURES Progress Report, period ending 15 Feb. 1983

S. M. Joshi and G. L. Goglia May 1983 7 p refs

(Grant NAG1-102)
(NASA-CR-170306; NAS 1.26:170306) Avail: NTIS HC A02/MF A01 CSCL 22B

The design of a controller for large space structures (LSS) based on the LQG theory requires the knowledge of the LSS parameters. Since apriori knowledge of the parameters is usually not reliable, the parameters must be identified prior to the controller synthesis, using methods such as the maximum likelihood technique. An expression is obtained for the Fisher information matrix for LSS, from which Cramer-Rao bounds can be obtained in order to determine the accuracy with which the parameters can be identified. Author

N83-24544*# Martin Marietta Corp., Denver, Colo.
ADVANCED EARTH OBSERVATION SPACECRAFT COMPUTER-AIDED DESIGN SOFTWARE: TECHNICAL, USER AND PROGRAMMER GUIDE Contractor Report, Sep. 1981 - Dec. 1982
C. E. Farrell and L. D. Krauze Apr. 1983 144 p refs
(Contract NAS1-16756)
(NASA-CR-166063; NAS 1.26:166063; MCR-82-1337) Avail: NTIS HC A07/MF A01 CSCL 22B

The IDEAS computer of NASA is a tool for interactive preliminary design and analysis of LSS (Large Space System). Nine analysis modules were either modified or created. These modules include the capabilities of automatic model generation, model mass properties calculation, model area calculation, nonkinematic deployment modeling, rigid-body controls analysis, RF performance prediction, subsystem properties definition, and EOS science sensor selection. For each module, a section is provided that contains technical information, user instructions, and programmer documentation. Author

N83-24545*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PERFORMANCE INTERFACE DOCUMENT FOR USERS OF TRACKING AND DATA RELAY SATELLITE SYSTEM (TDRSS) ELECTROMECHANICALLY STEERED ANTENNA SYSTEMS (EMSAS)
Richard Hockensmith, E. Devine, M. DiGiacomo, F. Hager, and R. Moss Jan. 1983 76 p
(NASA-TM-84953; G-83F0183; NAS 1.15:84953) Avail: NTIS HC A05/MF A01 CSCL 22B

Satellites that use the NASA Tracking and Data Relay Satellite System (TDRSS) require antennas that are crucial for performing and achieving reliable TDRSS link performance at the desired data rate. Technical guidelines are presented to assist the prospective TDRSS medium-and high-data rate user in selecting and procuring a viable, steerable high-gain antenna system. Topics addressed include the antenna gain/transmitter power/data rate relationship; Earth power flux-density limitations; electromechanical requirements dictated by the small beam widths, desired angular coverage, and minimal torque disturbance to the spacecraft; weight and moment considerations; mechanical, electrical and thermal interfaces; design lifetime failure modes; and handling and storage. Proven designs are cited and space-qualified assemblies and components are identified. Author

N83-24546# Honeywell Systems and Research Center, Minneapolis, Minn.
ACOSS-16 (ACTIVE CONTROL OF SPACE STRUCTURES) Final Technical Report, May 1981 - Jul. 1982
Michael F. Barrett and Dave F. Enns Griffiss AFB, N.Y. RADC Oct. 1982 264 p refs
(Contract F30602-81-C-0187; ARPA Order 3654; AF Proj. C654)
(AD-A123540; RADC-TR-82-225; Rept-82SRC43) Avail: NTIS HC A12/MF A01 CSCL 22/2

The objective of this effort is to develop, design and analyze techniques that can be used to meet future line of sight and jitter control requirements of large space structures that have onboard disturbances. This effort studied parameter identification on a representative large space structure and the impact of on-orbit identification on the design of a disturbance controller for the spacecraft. GRA

N83-24547# Control Dynamics Co., Huntsville, Ala.
ACOSS FIFTEEN (ACTIVE CONTROL OF SPACE STRUCTURES) Final Technical Report, 15 Apr. 1981 - 1 May 1982
Sherman M. Seltzer, Eugene H. Worley, and Randy J. York Griffiss AFB, N.Y. RADC Oct. 1982 106 p
(Contract F30602-81-C-0179; AF Proj. C654)
(AD-A123530; RADC-TR-82-198) Avail: NTIS HC A06/MF A01 CSCL 22/2

To study active structure control technology as applied to Large Space Structures (LSS). In particular, to develop analysis and design techniques for utilization of practicing control system engineers in their investigations of future Large Space Structures (LSS). These techniques will be use qualified through application to a representative model of a LSS. This objective is in support of the overall ACOSS objective which is to develop and understand a generic, unified structural dynamics and control technology base for LSS with stringent Line-of-Sight (LOS) and figure performance requirements that must be maintained in the presence of onboard and natural disturbances. This effort will be restricted to theory development, experiment design, demonstration and documentation of structural dynamics and control technology for large precision spacecraft. GRA

N83-24548# California Univ., Los Angeles. School of Engineering and Applied Science.
ADVANCES IN TECHNIQUES FOR TRACKING AND TERMINAL STATE ESTIMATION OF A GOAL SEEKING VEHICLE (THE TARGET RV) VIA AN OPTIMAL BMD INTERCEPT VEHICLE FILTER Final Report, 29 Nov. 1979 - 28 Nov. 1981
Blair Dillaway Mar. 1982 53 p refs
(Contract DASG60-80-C-0007)
(AD-A124628) Avail: NTIS HC A04/MF A01 CSCL 16/4

A common problem which arises in tactical situations is the tracking of a non-cooperative vehicle on the basis of noisy measurements received at a tracking station. The standard estimation procedures used in such circumstances assume that the vehicle can be modeled as a dynamic system subject to a white noise disturbance. In many situations, such a model may be inappropriate since the vehicle may be moving toward a specific goal, guided by some form of intelligence. The tracker should be able to incorporate knowledge of this fact into his algorithm for computing his optimal estimate. This report proposes a simple model for such competitive situations. The vehicle's equations of motions are described by a system of linear differential equations with a guidance law which minimizes a quadratic cost functional and moves the vehicle toward a goal unknown to the tracker. GRA

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-24549*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.

PERFECT BELL NOZZLE PARAMETRIC AND OPTIMIZATION CURVES

J. L. Tuttle and D. H. Blount May 1983 32 p refs
(NASA-RP-1104; NAS 1.61:1104) Avail: NTIS HC A03/MF A01 CSCL 21H

Nozzle contour data for untruncated Bell nozzles with expansion area ratios to 6100 and a specific heat ratio of 1.2 are provided. Curves for optimization of nozzles for maximum thrust coefficient within a given length, surface area, or area ratio are included. The nozzles are two dimensional axisymmetric and calculations were performed using the method of characteristics. Drag due to wall friction was included in the final thrust coefficient. Author

N83-24550*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
LOX/HYDROCARBON AUXILIARY PROPULSION SYSTEM STUDY Final Summary Report

G. F. Orton, T. D. Mark, and D. D. Weber Jul. 1982 79 p refs
(Contract NAS9-16305)
(NASA-CR-171655; NAS 1.26:171655; MDC-E2576) Avail: NTIS HC A05/MF A01 CSCL 21H

Liquid oxygen/hydrocarbon propulsion systems applicable to a second generation orbiter OMS/RCS were compared, and major system/component options were evaluated. A large number of propellant combinations and system concepts were evaluated. The ground rules were defined in terms of candidate propellants, system/component design options, and design requirements. System and engine component math models were incorporated into existing computer codes for system evaluations. The detailed system evaluations and comparisons were performed to identify the recommended propellant combination and system approach. S.L.

N83-24551*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
LOX/HYDROCARBON AUXILIARY PROPULSION SYSTEM STUDY Final Report

G. F. Orton, T. D. Mark, and D. D. Weber Jul. 1982 166 p refs
(Contract NAS9-16305)
(NASA-CR-171656; NAS 1.26:171656; MDC-E2548) Avail: NTIS HC A08/MF A01 CSCL 21H

Liquid oxygen (LOX)/hydrocarbon propulsion concepts for a 'second generation' orbiter auxiliary propulsion system was evaluated. The most attractive fuel and system design approach identified, and the technology advancements that are needed to provide high confidence for a subsequent system development were determined. The fuel candidates were ethanol, methane, propane, and ammonia. Even though ammonia is not a hydrocarbon, it was included for evaluation because it is clean burning and has a good technology base. The major system design options were pump versus pressure feed, cryogenic versus ambient temperature RCS propellant feed, and the degree of OMS-RCS integration. Ethanol was determined to be the best fuel candidate. It is an earth-storable fuel with a vapor pressure slightly higher than monomethyl hydrazine. A pump-fed OMS was recommended because of its high specific impulse, enabling greater velocity change and greater payload capability than a pressure fed system. S.L.

N83-24552*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN CONSIDERATIONS FOR LARGE SPACE ELECTRIC POWER SYSTEMS

David D. Renz, Robert C. Finke, N. John Stevens, James E. Triner, and Irving G. Hansen Apr. 1983 23 p refs
(NASA-TM-83064; E-1535; NAS 1.15:83064) Avail: NTIS HC A02/MF A01 CSCL 22B

As power levels of spacecraft rise to the 50 to 100 kW range, it becomes apparent that low voltage (28 V) dc power distribution and management systems will not operate efficiently at these higher power levels. The concept of transforming a solar array voltage at 150 V dc into a 1000 V ac distribution system operating at 20 kHz is examined. The transformation is accomplished with series-resonant inverter by using a rotary transformer to isolate the solar array from the spacecraft. The power can then be distributed in any desired method such as three phase delta to delta. The distribution voltage can be easily transformed to any desired load voltage and operating frequency. The reasons for the voltage limitations on the solar array due to plasma interactions and the many advantages of a high voltage, high frequency at distribution system are discussed. S.L.

N83-24553*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ANALYSIS OF FULL-TEST TOOLS AND THEIR LIMITATIONS AS APPLIED TO TERMINAL JUNCTION BLOCKS

James Lee Smith Apr. 1983 15 p refs
(NASA-TM-82520; NAS 1.15:82520) Avail: NTIS HC A02/MF A01 CSCL 21H

Discovery of unlocked contacts in Deutsch Block terminal junctions in Solid Rocket Booster flight hardware prompted an investigation into pull test techniques to help insure against possible failures. Internal frictional forces between socket and pin and between wire and grommet were examined. Pull test force must be greater than internal friction yet less than the crimp strength of the pin or socket. For this reason, a 100 percent accurate test is impossible. Test tools were evaluated. Available tools are adequate for pull testing. S.L.

N83-24554# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: NORTHERN ARIZONA COUNTIES

Don H. White and Larry A. Goldstone Aug. 1982 75 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004878; DOE/RA-50076/4) Avail: NTIS HC A04/MF A01

The regional market potential for utilizing geothermal energy was evaluated. Five potential geothermal resource areas, four of which have low temperature (< 900C, 1940F) potential and one possible igneous system were identified. The average population growth rate in the Northern Counties is expected to be five percent per year over the next 40 years, with Mohave and Yavapai Counties growing the fastest. Rapid growth is anticipated in all major employment sectors, including trade, service, manufacturing, mining and utilities. A regional energy use analysis is included, containing information on energy use patterns for all user classes. Water supplies are expected to be adequate for expected growth generally, though Yavapai and Gila Counties will experience water deficiencies. A preliminary district heating analysis is included for the towns of Alpine and Springerville. Both communities are believed located on geothermal resource sites. A section identifying potential geothermal resource users in northern Arizona, is also included. DOE

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-24555*# National Aeronautics and Space Administration, Washington, D. C.
ON SOME DERIVATIVES OF PHENYLETHERS, 2

C. Haeussermann and E. Bauer Jan. 1983 6 p Transl. into ENGLISH from Ber. Deut. Chem. Ges. (West Germany), v. 29, 1896 p 2083-2085 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-77020; NAS 1.15:77020) Avail: NTIS HC A02/MF A01 CSCL 07C

Products and the synthesis of chloronitrobenzol with certain phenolates are discussed, as is the p-oxyphenylether occasionally produced. Yield, melting point, and physical description are given

for each product. The products include 2,4'-dinitrophenylether; 2,2'-dinitrophenylether; p-nitrophenylether-p-oxybenzoic acid and its methylester; p-aminophenylether-p-oxybenzoic acid, its sulfate, and its barium salt; and p-oxypenylether. Author

N83-24556*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
THE 1ST SYMPOSIUM ON CHEMICAL EVOLUTION AND THE ORIGIN AND EVOLUTION OF LIFE
Donald L. DeVincenzi, ed. and Linda G. Pleasant, ed. [1982] 119 p Symp. held at Ames Research Center, Calif., 2-4 Aug. 1982
(NASA-CP-2276; NAS 1.55:2276) Avail: NTIS HC A06/MF A01 CSCL 06C

This symposium provided an opportunity for all NASA Exobiology principal investigators to present their most recent research in a scientific meeting forum. Papers were presented in the following exobiology areas: extraterrestrial chemistry primitive earth, information transfer, solar system exploration, planetary protection, geological record, and early biological evolution. Author

N83-24557# Sandia Labs., Albuquerque, N. Mex.
CHEMSEN: A COMPUTER CODE FOR SENSITIVITY ANALYSIS OF ELEMENTARY CHEMICAL REACTION MODELS
M. A. Kramer, R. J. Kee, and H. Rabitz Aug. 1982 20 p
(Contract DE-AC04-76DP-00789)
(DE82-020886; SAND-82-8230) Avail: NTIS HC A02/MF A01

A computer code that computes first-order sensitivity coefficients of constant temperature and pressure chemical kinetics problems is described. These coefficients measure quantitatively the dependence of the species concentrations on the rate constants of the reactions. The sensitivity equations are solved using the new, and highly efficient, Analytically Integrated Magnus method. The code accepts nearly format-free input, and is thus designed to be easy to use. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N83-24558*# Old Dominion Univ., Norfolk, Va. Dept. of Mechanical Engineering and Mechanics.
IMPACT DAMAGE OF COMPOSITE PLATES Progress Report, Sep. 1982 - Mar. 1983
K. M. Lal and G. L. Goglia Apr. 1983 41 p
(Grant NAG1-196)
(NASA-CR-170309; NAS 1.26:170309) Avail: NTIS HC A03/MF A01 CSCL 11D

A simple model to study low velocity transverse impact of thin plates made of fiber-reinforced composite material, in particular T300/5208 graphite-epoxy was discussed. This model predicts the coefficient of restitution, which is a measure of the energy absorbed by the target during an impact event. The model is constructed on the assumption that the plate is inextensible in the fiber direction and that the material is incompressible in the z-direction. Such a plate essentially deforms by shear, hence this model neglects bending deformations of the plate. The coefficient of restitution is predicted to increase with large interlaminar shear strength and low transverse shear modulus of the laminate. Predictions are compared with the test results of impacted circular and rectangular clamped plates. Experimentally measured values of the coefficient of restitution are found to agree with the predicted values within a reasonable error. Author

N83-24559*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DESIGN PROCEDURES FOR FIBER COMPOSITE STRUCTURAL COMPONENTS: RODS, COLUMNS AND BEAM COLUMNS
Christos C. Chamis 1983 32 p refs Presented at the 38th Ann. Conf. of the Soc. of the Plastics Ind. (SPI) Reinforced Plastics/Composites Inst., Houston, Tex., 7-11 Feb. 1983
(NASA-TM-83321; E-1562; NAS 1.15:83321) Avail: NTIS HC A03/MF A01 CSCL 11D

Step by step procedures are described which are used to design structural components (rods, columns, and beam columns) subjected to steady state mechanical loads and hydrothermal environments. Illustrative examples are presented for structural components designed for static tensile and compressive loads, and fatigue as well as for moisture and temperature effects. Each example is set up as a sample design illustrating the detailed steps that are used to design similar components. Author

N83-24560*# Mississippi Methodist Rehabilitation Center, Jackson.
ORTHOTIC DEVICES USING LIGHTWEIGHT COMPOSITE MATERIALS Final Report
Ernest Harrison, Jr. Jan. 1983 74 p refs
(Contract NAS1-15477)
(NASA-CR-166105; NAS 1.26:166105) Avail: NTIS HC A04/MF A01 CSCL 11D

Potential applications of high strength, lightweight composite technology in the orthotic field were studied. Several devices were designed and fabricated using graphite-epoxy composite technology. Devices included shoe plates, assistive walker devices, and a Simes prosthesis reinforcement. Several other projects having medical application were investigated and evaluations were made of the potential for use of composite technology. A seat assembly was fabricated using sandwich construction techniques for the Total Wheelchair Project. S.L.

N83-24561*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BUCKLING AND FAILURE CHARACTERISTICS OF GRAPHITE-POLYIMIDE SHEAR PANELS
Mark J. Stuart and Jane A. Hagaman May 1983 24 p refs
(NASA-TP-2153; L-15557; NAS 1.60:2153) Avail: NTIS HC A02/MF A01 CSCL 11D

The buckling and failure characteristics of unstiffened, blade stiffened, and hat stiffened graphite-polyimide shear panels are described. The picture frame shear test is used to obtain shear stress-strain data at room temperature and at 316 deg C. The experimental results are compared with a linear buckling analysis, and the specimen failure modes are described. The effect of the 316 deg C test temperature on panel behavior are discussed. Author

N83-24562*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FAILURE MECHANICS IN LOW-VELOCITY IMPACTS ON THIN COMPOSITE PLATES
Wolf Elber May 1983 26 p refs
(NASA-TP-2152; L-15588; NAS 1.60:2152) Avail: NTIS HC A03/MF A01 CSCL 11D

Eight-ply quasi-isotropic composite plates of Thornel 300 graphite in Narmco 5208 epoxy resin (T300/5208) were tested to establish the degree of equivalence between low-velocity impact and static testing. Both the deformation and failure mechanics under impact were representable by static indentation tests. Under low-velocity impacts such as tool drops, the dominant deformation mode of the plates was the first, or static, mode. Higher modes are excited on contact, but they decay significantly by the time the first-mode load reaches a maximum. The delamination patterns were observed by X-ray analysis. The areas of maximum delamination patterns were observed by X-ray analysis. The areas of maximum delamination coincided with the areas of highest peel stresses. The extent of delamination was similar for static and impact tests. Fiber failure damage was established by tensile tests on small fiber bundles obtained by deplying test specimens. The onset of fiber damage was in internal plies near the lower surface of the plates. The distribution and amount of fiber damage was similar fo impact and static tests. Author

N83-24563# Southwest Research Inst., San Antonio, Tex.
SIMULATED BLAST TESTING OF ADVANCE INTERCEPTOR MATERIALS Final Report

Edward D. Esparza May 1982 43 p refs
(Contract DAAG46-79-C-0056; DA Proj. 8X3-63304-D-215)
(AD-A124374; SWRI-02-5748; AMMRC-TR-82-29) Avail: NTIS HC A03/MF A01 CSCL 11/4

An experimental program was conducted to develop a simulation blast loading technique for testing advance interceptor materials. Kevlar/epoxy, carbon/epoxy, and hybrid frusta were tested with 50 and 80 psig reflected blast loads. The carbon frusta sustained the least amount of visible damage, while the hybrid frusta revealed the most damage from the simulated blast loads. GRA

N83-24564# Massachusetts Inst. of Tech., Cambridge. Dept. of Electrical Engineering and Computer Sciences.
CURE MONITORING AND CONTROL WITH COMBINED DIELECTRIC/TEMPERATURE PROBES Technical Report, Jun. - Dec. 1982
Stephen D. Senturia, Norman F. Sheppard, Jr., Huan L. Lee, and Steven B. Marshall 10 Jan. 1983 17 p refs Presented at the SAMPE Meeting, Anaheim, Calif., Apr. 1983
(Contract N0014-78-C-0591; Grants NSF DMR-81-19295; NSF ENG-77-17219; NR Proj. 356-691)
(AD-A123512; TR-6) Avail: NTIS HC A02/MF A01 CSCL 11/4

The dielectric and conductive properties of resins used as adhesives and as matrices in composites undergo large changes during cure. The use of these changing electrical properties to monitor cure is a well established technique. The most common structure for such measurements is a parallel plate capacitor using fixed metal plates or metal foils. A relatively new alternative structure is the Microdielectrometer chip, a miniature integrated circuit probe that can be embedded in the sample under test. This paper reports a new development in Microdielectrometry technology, the addition of a temperature sensor to the probe. The combined dielectric temperature probe provides highly localized measurements of both temperature and changing dielectric properties. Data are presented that illustrate the use of the Microdielectrometer to detect the viscosity minimum during cure of staged prepreg resin, and the use of the on-chip temperature feature to provide feedback control signals during a test cure. Author (GRA)

N83-24565# Aerospace Corp., El Segundo, Calif. Materials Sciences Lab.
MESOPHASE BEHAVIOR IN CARBON FIBER BUNDLES
J. L. White, C. B. Ng, P. M. Sheaffer, and M. Buechler 1 Jun. 1982 27 p refs
(Contract F04701-81-C-0082)
(AD-A123322; TR-0082(2728-01)-1; SD-TR-82-88) Avail: NTIS HC A03/MF A01 CSCL 11/4

Some experimental procedures required to observe the development of mesophase morphologies in three dimensional carbon-carbon composites during pyrolysis at high pressures have been tested in preliminary room-pressure trials. Bundles of mesophase carbon fiber in petroleum pitch were pyrolyzed under three conditions of constraint. The results confirm a recent report that the mesophase transformation proceeds differently within a fiber bundle than in bulk pitch. In the early stages of transformation, both pitch and mesophase wet the fiber, and the mesophase tends to occur preferentially within the open wedge of radially structured fiber. After pyrolysis through the stage of mesophase hardening, the matrix porosity appears to depend on the constraint of the fiber bundle. The mesophase at that stage is a fragile solid easily fractured by local stresses within the fiber bundle.
Author (GRA)

N83-24566# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
NONLINEAR TRANSIENT ANALYSIS OF LAYERED COMPOSITE PLATES Annual Report, 1 Apr. 1981 - 15 Jun. 1982
J. N. Reddy Jul. 1982 8 p refs
(Grant AF-AFOSR-0142-81; AF Proj. 2307)
(AD-A123182; AFOSR-82-1063TR) Avail: NTIS HC A02/MF A01 CSCL 11/4

The results obtained in this research should be of interest to composite-structure (and aircraft) designers, and to experimentalists and numerical analysts in verifying their results. Research in the following categories, among others, of systems of engineering interest is expected to benefit from the results of this research.
GRA

N83-24567# California Univ., Los Angeles. School of Engineering and Applied Science.
STRESSES DURING FABRICATION OF CYLINDRICALLY WOVEN CARBON-CARBON COMPOSITES Interim Technical Report, 1 Aug. 1981 - 31 Oct. 1982
George Sines and Jacob Cohen 10 Nov. 1982 22 p refs
(Contract N00014-77-C-0505)
(AD-A123153; UCLA-ENG-82-78) Avail: NTIS HC A02/MF A01 CSCL 11/4

Carbon-carbon billets sometimes experience failure during fabrication. In order to understand the stresses causing these failures, we have modeled the elastically anisotropic billet as an assembly of very thin-walled, isotropic cylinders. Alternate cylinders have different properties; one set models the fibers, the other the matrix. The assembly has cylindrical anisotropy and permits simple calculation of the thermal stresses of fabrication. The stresses are calculated for the billet after cracks have been filled with pitch and reheated. A fabrication microcracking morphology is presented and the causes of this cracking discussed. The benefit of adding circumferential fibers to the inner and outer diameters is shown. Author (GRA)

N83-24568# Drexel Univ., Philadelphia, Pa.
ON MIXED-MODE FRACTURE IN OFF-AXIS UNIDIRECTIONAL GRAPHITE-EPOXY COMPOSITES
A. S. D. Wang, N. N. Kishore, and William W. Feng Jul. 1982 9 p refs Presented at the 4th Intern. Conf. on Composite Mater., Tokyo, 24-28 Oct. 1982 Prepared in cooperation with California Univ., Livermore, Lawrence Livermore Lab.
(Contract W-7405-eng-48)
(DE82-019108; UCRL-87827; CONF-821023-1) Avail: NTIS HC A02/MF A01

The results of a fracture experiment, in which matrix dominant mixed mode cracks are induced with controlled propagation direction and controlled values mode 2 to mode 1 ratio are discussed. The test specimens used belong to a class of off axis, doubly side notched unidirectional graphite epoxy composite. By varying the off axis angle from 0 to 90 deg, a wide range of mixed mode cracking conditions are created under a simple uniaxial tension. From the test results the mixed mode material fracture toughness measured in terms of the critical energy release rate G/sub (1,2)c/ is determined as a continuous function of G/sub 2//G/sub 1/ratio. DOE

N83-24569# California Univ., Livermore. Lawrence Livermore Lab. Materials Test and Evaluation Sect.
MATRIX-DOMINATED TIME-DEPENDENT DEFORMATION AND DAMAGE OF GRAPHITE EPOXY COMPOSITE EXPERIMENTAL DATA UNDER RAMP LOADING
Edward M. Wu, Richard L. Moore, and Nhan Q. Nguyen Nov. 1982 121 p
(Contract W-7405-eng-48; AF Proj. 2307)
(DE83-005706; UCID-19487; AFWAL-TR-82-3076) Avail: NTIS HC A06/MF A01

Specimens of + or - 450 T300/5208 laminates were tested in tension with complete instrumentation for stress, strain, and time recordings. Experimental data were recorded and archived in digital form. Polynomial series were fitted to the experimental data for compilation, dissemination and future retrieval. DOE

N83-24570# Bendix Corp., Kansas City, Mo.
SILICON CARBIDE-REINFORCED PLASTIC MATERIAL
Hiroshi Enomoto and Kazuhiro Hara Nov. 1982 32 p refs Transl. into ENGLISH from Japanese Early Disclosure Patent Gazette, 6 Oct. 1981 In ENGLISH and JAPANESE
(Contract DE-AC04-76DP-00613)

(DE83-004944; BDX-613-2875) Avail: NTIS HC A03/MF A01

This material is prepared by mix molding homogeneously a mixture of plastic material with an ALPHA-SiC powder, whose particles size is less than 1 micron, the alpha-SiC content is less than 10%, and whose average long dia/short dia ratio is 1.2 to 1.7. The ALPHA-SiC powder was washed with HF, dried, and treated with a silane coupling agent. The plastic is from the group thermosetting, thermoplastic, and heat resistant resins. The fabrication process comprises 3 steps: dispersing the ALPHA-SiC powder into the plastic and kneading, crushing the kneaded material into fine powder, and finally molding the powder in a metal mold. DOE

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-24571*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

PORE SIZE ENGINEERING APPLIED TO THE DESIGN OF SEPARATORS FOR NICKEL-HYDROGEN CELLS AND BATTERIES

Kathleen M. Abbey and Doris L. Britton 1983 11 p refs Proposed for presentation at the 18th Intersoc. Energy Conversion Eng. Conf., Orlando, Fla., 21-26 Aug. 1983; sponsored by American Inst. of Chemical Engineers, IEEE, AIAA, American Chemical Society, ANS, ASME, and SAE

(NASA-TM-83386; E-1663; NAS 1.15:83386) Avail: NTIS HC A02/MF A01 CSCL 10C

Pore size engineering in starved alkaline multiplate cells involves adopting techniques to widen the volume tolerance of individual cells. Separators with appropriate pore size distributions and wettability characteristics (capillary pressure considerations) to have wider volume tolerances and an ability to resist dimensional changes in the electrodes were designed. The separators studied for potential use in nickel-hydrogen cells consist of polymeric membranes as well as inorganic microporous mats. In addition to standard measurements, the resistance and distribution of electrolyte as a function of total cell electrolyte content were determined. New composite separators consisting of fibers, particles and/or binders deposited on Zircar cloth were developed in order to engineer the proper capillary pressure characteristics in the separator. These asymmetric separators were prepared from a variety of fibers, particles and binders. Author

N83-24572*# National Aeronautics and Space Administration. Pasadena Office, Calif.

STABILIZED LANTHANUM SULPHUR COMPOUNDS Patent Application

George H. Reynolds (JPL, California Inst. of Tech., Pasadena), Norbert B. Elsner (JPL, California Inst. of Tech., Pasadena), and Clyde H. Shearer, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 28 Jan. 1983 7 p

(Contract NAS7-100)

(NASA-Case-NPO-16135-1; US-Patent-Appl-SN-470114) Avail: NTIS HC A02/MF A01 CSCL 07C

Lanthanum sulfide is maintained in the stable cubic phase form over a temperature range of from 500 C to 1500 C by adding to it small amounts of calcium, barium, or strontium. This compound is an excellent thermoelectric material. NASA

N83-24573*# National Aeronautics and Space Administration, Washington, D. C.

COST OF PHOSPHATE REMOVAL IN MUNICIPAL WASTEWATER TREATMENT PLANTS

H. Schuessler Mar. 1983 17 p refs Transl. into ENGLISH from GWF/Wasser/Abwasser (West Germany), v. 122, no. 6, 1981 p 251-257 Transl. by Kanner (Leo) Associates, Redwood City, Calif.

(Contract NASw-3541)

(NASA-TM-77060; NAS 1.15:77060) Avail: NTIS HC A02/MF A01 CSCL 07D

Construction and operating costs of advanced wastewater treatment for phosphate removal at municipal wastewater treatment plants have been investigated on orders from the Federal Environmental Bureau in Berlin. Particular attention has been paid to applicable kinds of precipitants for pre-, simultaneous and post-precipitation as well as to different phosphate influent and effluent concentrations. The article offers detailed comments on determination of technical data, investments, capital costs, operating costs and annual costs as well as potential cost reductions resulting from precipitation. Selected results of the cost investigation are shown in graphical form as specific investments, operating and annual costs depending on wastewater flow. Author

N83-24574# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).

STUDIES OF SUBSTITUENT AND SOLVENT EFFECTS ON SOLVOLYSIS REACTIONS. 1: THE EFFECT OF POLAR ALPHA-SUBSTITUENTS ON THE RATE OF ALKALINE ESTER HYDROLYSIS IN WATER AT DIFFERENT TEMPERATURES

J. Barthel, G. Baeder, and G. Schmeer 1983 17 p refs Transl. into ENGLISH from Z. fuer Phys. Chem. Neue Folge (Frankfurt), v. 62, 1968 p 63-74

(NRC/CNR-TT-2059; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

The rate constants and the activation parameters for the saponification of mono, di and tri halogeno-hydroxy, methoxy and ethoxy-methyl acetates and ethyti acetates were determined from the rapid changes in the conductivity during the course of the reaction. The effect of the substituent is explained by the electrostatic interaction of the reaction partners. Author

N83-24575*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EXPERIMENTAL DESIGN OF AN INTERLABORATORY STUDY FOR TRACE METAL ANALYSIS OF LIQUID FLUIDS

Leslie A. Greenbauer-Seng May 1983 44 p refs

(NASA-TP-2148; E-1311; NAS 1.60:2148) Avail: NTIS HC A03/MF A01 CSCL 07D

The accurate determination of trace metals and fuels is an important requirement in much of the research into and development of alternative fuels for aerospace applications. Recognizing the detrimental effects of certain metals on fuel performance and fuel systems at the part per million and in some cases part per billion levels requires improved accuracy in determining these low concentration elements. Accurate analyses are also required to ensure interchangeability of analysis results between vendor, researcher, and end use for purposes of quality control. Previous interlaboratory studies have demonstrated the inability of different laboratories to agree on the results of metal analysis, particularly at low concentration levels, yet typically good precisions are reported within a laboratory. An interlaboratory study was designed to gain statistical information about the sources of variation in the reported concentrations. Five participant laboratories were used on a fee basis and were not informed of the purpose of the analyses. The effects of laboratory, analytical technique, concentration level, and ashing additive were studied in four fuel types for 20 elements of interest. The prescribed sample preparation schemes (variations of dry ashing) were used by all of the laboratories. The analytical data were statistically evaluated using a computer program for the analysis of variance technique. S.L.

N83-24576# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.

A CRITICAL REVIEW OF PULSATING COMBUSTION

Y. Goldman and Y. M. Timnat Nov. 1981 20 p refs

(TAE-468) Avail: NTIS HC A02/MF A01

In pulsating combustors a proper feedback between the flow and combustion processes results in periodic variations of the

flow properties inside the combustor. The types of pulsating combustors and their applications are discussed. Author

N83-24577# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Materials Lab.
TIME-DOMAIN FIRST BORN APPROXIMATIONS TO ELASTODYNAMIC BACKSCATTER WITH APPLICATIONS TO NONDESTRUCTIVE EVALUATION OF COMPOSITES Final Report, Jun. 1981 - Jan. 1982
Gregory T. Warhola Dec. 1982 54 p refs
(AF Proj. 2418)
(AD-A123541; AFWAL-TR-82-4044) Avail: NTIS HC A04/MF A01 CSCL 11/4

Fiber-reinforced composite materials are being introduced into primary structures of modern jet fighter aircraft, e.g., vertical and horizontal stabilizers on the F-15 and F-16 fighters. These materials are made of many layers; each layer consists of many rows of parallel fibers bound together by a matrix material of different composition than the fibers. Failure often occurs in these composites via delamination which initiates at gas bubbles (porosity) remaining in the matrix after the manufacturing process. For this and other reasons, non-destructive inspection techniques capable of determining the presence of the porosity are being sought. Current efforts include inspection with elastic waves. Items of interest include comparison of the response from the fibers to that from porosity and the degree to which the fibers may appear transparent to the waves. GRA

N83-24578# Drexel Univ., Philadelphia, Pa. Dept. of Chemistry.
INFRARED EMISSION FROM GAS-AEROSOL REACTIONS Contractor Report, 1 Jul. 1980 - 30 Jun. 1982
Raymond A. Mackay and Edward W. Stuebing Aberdeen Proving Ground, Md. Army Armament Research and Development Command Sep. 1982 38 p refs
(Contract DAAK11-80-C-0051; DA Proj. 1L1-61102-A-71A)
(AD-A123365; AD-E410617; ARCSL-CR-82028) Avail: NTIS HC A03/MF A01 CSCL 07/2

The present investigation has been designed to produce infrared emission by means of an exothermic reaction between a liquid aerosol and a gas. A number of gas-aerosol systems employing acid-base reactions have been examined and significant levels of radiation observed from the reactions of chlorosulfuric acid aerosol with gaseous amonia and water. Other systems which were screened including sulfuric acid-ammonia, octanoic acid-ammonia, and octylamine-hydrogen chloride, have produced detectable levels of radiation. Some methods for the investigation of emission from the gas-aerosol reactions have been explored, and the results of these studies utilizing a chlorosulfonic acid aerosol system are presented. GRA

N83-24579# Naval Civil Engineering Lab., Port Hueneme, Calif.
IMPROVED FIELD PERFORMANCE FOR REVERSE OSMOSIS SYSTEMS Technical Note, Mar. 1980 - Sep. 1981
T. A. Kuepper Sep. 1982 92 p refs
(AD-A124244; NCEL-TN-1644) Avail: NTIS HC A05/MF A01 CSCL 13/2

The report describes two test programs: the first one involved the physical cleaning of reverse osmosis (RO) membranes by means of flow surging and ultrasonic cavitation. The objective was to clean RO membranes in situ without using chemical additives. It was shown that ultrasonic cleaning is an effective method for removing ferric oxide, calcium carbonate/sulfate scale, and bentonite clay deposits from individual pieces of RO membranes. However, ultrasonic cavitation was not effective when applied to RO membranes in a spiral-wound configuration. Flow surging proved to be an effective method for cleaning spiral-wound RO modules in the preliminary test program conducted. A second test program involved the evaluation of a tubular fabric filter which has the potential of replacing conventional mixed media filters with substantial weight and filter housing area savings. During the test program the filter removed over half of the turbidity of the feedwater used without any chemical additives and could be cleaned intermittently by backwashing. Author (GRA)

N83-24580# State Univ. of New York, Buffalo. Dept. of Chemistry.
CATHODIC STRIPPING ANALYSIS COMPLICATED BY ADSORPTION PROCESSES: DETERMINATION OF 2-THIOURACIL AT A ROTATING SILVER DISK ELECTRODE
Maria Hepel and Robert A. Osteryoung 1 Jan. 1983 49 p refs Submitted for publication
(Contract N00014-79-C-0682; NR Proj. 051-715)
(AD-A124296; SUNYBUF/DC/TR-11) Avail: NTIS HC A03/MF A01 CSCL 07/4

A new method of interpretation of cathodic stripping peak current data is proposed where slow adsorption/desorption of the solution species to be determined is involved. Mechanisms of processes taking place during deposition and stripping steps which are complicated by adsorption/desorption are considered. As an example of such a system, the electrodeposition and stripping of a 2-thiouracil silver compound at the rotating silver disk electrode have been investigated at physiological pH = 7.2. Two concentration regions for the determination of 2-thiouracil, which appear in nature as a pyrimidine base of nucleic acid, have been found. The first region involves microphase deposition which occurs if the total charge passed through the electrode during cathodic stripping of the most easily removed material is less than 70 micro c/sq cm. The second region, for charges greater than 200 micro c/sq cm, corresponds to macrophase stripping. The effect of concentration, potential sweep rate, rotation speed, deposition potential and other parameters on the shape and height of the stripping peaks have been determined. The lowest concentration of 2-thiouracil determined was 6 x 10 to the -8th power mol/cu m. GRA

N83-24581# Indiana Univ., Bloomington. Dept. of Chemistry.
METAL-METAL BONDS AND METAL CARBON BONDS IN THE CHEMISTRY OF MOLYBDENUM AND TUNGSTEN ALKOXIDES
Malcolm H. Chisholm 7 Feb. 1983 127 p refs Submitted for publication
(Contract N00014-79-C-0044; NR Proj. 056-703)
(AD-A124298; INDU/DC/TR-83/1-MC) Avail: NTIS HC A07/MF A01 CSCL 07/3

Metal-metal bonds are found in alkoxides of molybdenum and tungsten when the metal atoms are in oxidation states 2 through 5. Metal-metal bonds may be localized and multiple or single in order, or may be delocalized in cluster molecular orbitals. The structures of these metal alkoxides are quite different from those seen previously. Metal-metal bonds provide a reservoir of electrons for redox reactions: the reservoir may be tapped in oxidative-addition reactions and filled in reductive-elimination reactions. Alkoxide ligands may act as four or two electron donor ligands and may readily change between terminal and bridging sites. This allows for the facile interconversion of saturated and unsaturated metal centers. As strong Pi-donor ligands, they can enhance backbonding to pi-acid ligands on the same metal. By pi-donating to vacant metal d orbitals, they may suppress metal-hydride abstraction from coordinated alkyl, alkylidene and alkylidyne ligands and they stabilize metals in high oxidation states. A variety of steric control can be engineered by choice of alkyl (RO0 groups and this may greatly influence structure, M-M bonding and reactivity of coordinated ligands. GRA

N83-24582# Aerospace Corp., El Segundo, Calif. Electronics Research Lab.
DETERMINATION OF Al IN GA(1-x)Al(x)As BY AUGER SPECTROSCOPY, ION MICROPROBE MASS ANALYSIS, AND PHOTOLUMINESCENCE
T. S. Stewart (Hewlett-Packard), S. I. Boldish, G. A. Evans, N. Marquez, D. G. Heflinger, G. A. Evans, J. B. Kirk, A. Ceruzzi, A. Mantie, and T. Stockton 6 Dec. 1982 32 p refs Prepared in cooperation with TRW Systems and Energy, Redondo Beach, Calif. and Laser Diode Labs., New Brunswick, N. J.
(Contract F04701-82-C-0083)
(AD-A124300; SD-TR-82-90; TR-0083(3925-01)-3) Avail: NTIS HC A03/MF A01 CSCL 07/4

Single layers of Ga (1-x)A1(x)As were grown on semi-insulating

Cr-doped GaAs substrates by liquid phase epitaxy. The samples consisted of six series. Within each series, the mole fraction of Al ranged from 0 to 0.45. Each series was either doped p with Ge or n with Te. The doping levels ranged from 10 to the 15th power to 10 to the 19th power carriers/cc. The mole fraction of Al in each sample was measured independently by Auger electron spectroscopy, ion microprobe mass analysis, and photoluminescence for comparison with phase diagram predictions. The carrier concentrations were estimated by the half-width of the photoluminescence peaks. The techniques, and their discrepancies and agreements, are discussed. GRA

N83-24583# University of Southern California, Los Angeles. Dept. of Chemistry.
SYNTHESIS, KINETICS, AND PHOTOCHEMISTRY OF THE CHROMIUM (III) DICYANOAQOEDTA COMPLEX
Zhong Chen, Marc Cimolino, and Arthur W. Adamson Feb. 1983 33 p refs Submitted for publication Sponsored in part by NSF and the People's Republic of China
(Contract N00014-76-C-0548; NR Proj. 051-609)
(AD-A124302; TR-18) Avail: NTIS HC A03/MF A01 CSCL 07/3

The complex Cr(Y)(CN)2(H2O)(3-) resembles the various cyano-aquo and cyano-amine complexes of Cr(III) in that the thermal reaction is one of cyanide aquation, the rate increasing with decreasing pH. Unlike the other cases, however, there does not appear to be appreciable contribution to the rate from a path involving -CrCNH. It is possible that the aquation is assisted by internal protonation of a cyano grouped through hydrogen boding from a non-coordinated but protonated carboxyl group. While the cyano-ammine complexes show primarily ammonia photoaquation, the photochemistry of our complex is one of cyanide aquation only. A likely explanation, however, is that labilization of other ligands is either blocked, or if it does occur, is unobservable under our conditions. Both the quantum yield behavior and the emission behavior are consistent with the photolysis and emission rules proposed for Cr(III) complexes. GRA

N83-24584# United Technologies Research Center, East Hartford, Conn.
CARS DIAGNOSTICS OF HIGH PRESSURE COMBUSTION Final Technical Report, 15 Feb. 1979 - 30 Sep. 1982
John H. Stufflebeam, John A. Shirley, and Robert J. Hall Nov. 1982 106 p refs
(Contract DAAG29-79-C-0008)
(AD-A124304; ARO-16124.6-CH; R82-954566-F) Avail: NTIS HC A06/MF A01 CSCL 21/2

Under Contract DAAG29-79-C-0008 sponsored by the Army Research Office, the United Technologies Research Center (UTRC) has conducted basic research investigations into coherent anti-Stokes Raman spectroscopy (CARS). CARS is a remote laser diagnostic technique for temperature and species measurements in hostile combustion environments. As such it possesses considerable relevance to the Army in the general areas of ballistics, propulsion and internal combustion engines. This final report describes the results of the investigation which were conducted in two specific areas. The first area concerns the effects of high pressure, specifically the phenomenon of collisional narrowing, on CARS spectra from which temperature and density information device. Experimental studies of CARS spectra are conducted in N2 and CO2 in a heated, high pressure cell. The experimental spectra were in excellent agreement with the theoretical model developed to describe high pressure CARS spectroscopy.
Author (GRA)

N83-24585# Indiana Univ., Bloomington. Dept. of Chemistry.
SIGNAL-TO-NOISE CONSIDERATIONS IN FLUCTUATION ANALYSIS SPECTROSCOPIC TECHNIQUES (FAST) Interim Technical Report
J. M. Ramsey and G. J. Hieftje 20 Jan. 1983 39 p refs
(Contract N00014-76-C-0383)
(AD-A123698; INDU/DC/GMH/TR-83/52; Rept-61) Avail: NTIS HC A03/MF A01 CSCL 07/4

It is possible to determine fluorescence lifetimes from the frequency response of a fluorophore as well as from its time response. Various schemes for measuring such a response curve are illustrated and include the use of sources whose intensity is modulated at single, swept frequencies, at several frequencies simultaneously, or over a broad, continuous band of frequencies. Detection methods which are considered include a single broad-frequency-response device, one which is swept, and another which hops from one modulated frequency to another. Signal-to-noise expressions are derived for each combination of source and detector and conclusions are drawn from comparison of the S/N expressions. From these considerations and the availability of existing sources for use in time-resolved fluorimetry, the most attractive approaches appear to be one which employs a source modulated at several frequencies simultaneously, each of which is monitored by its own tuned detector or a sinusoidally modulated source, swept synchronously with a tuned detector. GRA

N83-24586# Chicago Univ., Ill.
PHOTOEMISSION OF Xe AND Kr ADSORBED ON THE W(110) PLANE
R. Opila and R. Gomer [1981] 51 p refs
(Contract N00014-77-C-0018)
(AD-A123580) Avail: NTIS HC A04/MF A01 CSCL 07/4

In this paper we report results of UPS and XPS studies of Xe adsorbed on clean, Xe covered, oxygen covered, and CO covered W(110) surfaces and also of Kr on clean and oxygen covered surfaces. In particular, we have examined the coverage dependence of the Xe 5p3/2 splitting on clean and oxygen covered surfaces, the broadening and shifts resulting from adsorption on oxygen and CO precovered surfaces and the changes in intensity caused by these conditions. GRA

N83-24587# Aerospace Corp., El Segundo, Calif. Aerophysics Lab.
CATALYTIC REDUCTION OF NITROGEN DIOXIDE
Peter Breisacher, Parameswar Mahadevan, and John G. Coffer 30 Sep. 1982 28 p refs
(Contract F04701-81-C-0082)
(AD-A123176; SD-TR-82-83; TR-0082(2448)-1) Avail: NTIS HC A03/MF A01 CSCL 07/2

The feasibility of using a noble metal catalytic reactor to treat the effluents from a scrubber or incinerator treating N2O4/NO2 at space shuttle launch sites and other STS facilities has been explored experimentally in the laboratory. The major objective of the test program is to measure the efficiency of reduction of NO2 at concentrations of a few thousand parts per million in an inert gas diluent to threshold limit value levels. The catalytic reduction is accomplished with an admixture of CO to the NO2 diluent gas mixture. Author (GRA)

N83-24588# Princeton Univ., N. J. Dept. of Mechanical and Aerospace Engineering.
FUELS COMBUSTION RESEARCH Final Report, 1 Oct. 1978 - 30 Sep. 1981
Irvin Glassman and Frederick L. Dryer 30 Jul. 1982 38 p refs
(Contract F49620-78-C-0004; AF Proj. 2308)
(AD-A123118; AFOSR-82-1064TR; MAE-1570) Avail: NTIS HC A03/MF A01 CSCL 12/2

Because propane is the simplest hydrocarbon which exhibits characteristics similar to those of more complex fuels, a thorough study of the pyrolysis and oxidation of propane was undertaken in the Princeton turbulent flow reactor. The pyrolysis rate was found to first order with respect to the fuel with a pre-exponential factor of 3.2 x 10 to the 12.5 power and activation energy of 86. 65 kcal/mole. A detailed mechanism was developed which fits a wide range of data and indicates that the literature values for the rate constant for the reaction methyl plus propane would be in error. This and earlier work with hydrocarbon oxidation provided the means for developing an overall kinetic scheme for all aliphatic hydrocarbon oxidation which would accurately predict major species formed and the temperature-time history (rate of heat release) of the reaction. GRA

N83-24589# Tennessee Univ., Tullahoma. Space Inst.
HIGH-TEMPERATURE COMBUSTION OF PULVERIZED COAL Ph.D. Thesis
William L. Holt Feb. 1982 157 p refs
(Contract DE-AC02-79ET-10815)
(DE82-022505; DOE/ET-10815/63) Avail: NTIS HC A08/MF A01

The combustion of coal under conditions of high heating rates and high final temperatures is discussed. Studies were made on the effects of mixing rate and residence time on the combustion of bituminous coal. Nominal heating rates of 105 K per second with final combustion temperatures on the order of 3000 K characterized the typical test conditions. The stoichiometry was nominally 0.90 with oxygen concentrations in the oxidant above 55%. The experimental results were compared to a theoretical coal combustion model involving a one-step, first order Arrhenius reaction rate constant. This model proved to be adequate for the test conditions being studied. Conclusions were reached as to the behavior of pulverized coal under flame conditions such as those that might be experienced in a magnetohydrodynamics coal combustor. Qualitative information is presented as to the behavior of the coal particles during combustion and subsequent burn-out of the carbon. Recommendations for improving the coal combustion model are given. DOE

N83-24590# Oregon Univ., Eugene.
LASER SPECTROSCOPY OF COMBUSTION INTERMEDIATES
Paul C. Engelking 1982 6 p refs
(Contract DE-AT06-79ER-10435)
(DE83-004869; DOE/ER-10435/2) Avail: NTIS HC A02/MF A01

The use of laser techniques to probe reaction systems, including combustion was examined. Spectroscopic information on molecular radicals important to combustion is provided. The capabilities of laser induced fluorescence apparatus by placing laser, monochromator, and detection electronics under computer control is extended. This greatly increases the rate at which data may be collected. An unidentified transition that was tentatively identified with HCN () was observed. Laser induced fluorescence spectra of methoxyl radicals are observed at vibrational resolution. The intersystem energy difference through the value of TO is established and the bond length increase in the a (4) (UC OMEGA) (+) state through b0 is measured. DOE

N83-24591# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
CERAMIC-METAL SOLID ELECTROLYTES
R. J. Lauf and C. S. Morgan Mar. 1982 31 p refs
(Contract W-7405-eng-26)
(DE82-009034; ORNL/TM-8154) Avail: NTIS HC A03/MF A01

The sodium sulfur battery is a candidate for application to electric vehicles and utility load leveling. The electrolyte in this battery, beta-Al2O3, often fails by fracture, which in many cases is initiated by electrolytic degradation. Technology to produce shock resistant mechanically tough alpha-Al2O3-based cermets was extended to include solid electrolytes based on beta-Al2O3. Compositions examined beta-Al2O3-Pt and beta-Al2O3-Cr, were found to have ionic conductivities comparable to beta-Al2O3 fabricated in the same way. No special problems with the submicron size metal inclusions were observed in preliminary tests. This concept is generic and could conceivably be applied to ceramic solid electrolytes in other chemical systems. DOE

N83-24592# Washington State Univ., Pullman. Dept. of Mechanical Engineering.
EVALUATION OF A RECTANGULAR OPPOSED-JET BURNER FOR PULVERIZED-COAL DIFFUSION-FLAME STUDIES
Ali M. Zghoul, Robert N. Comstock, and William L. Grosshandler Apr. 1982 29 p refs Presented at the Spring Meeting of the Western States Sect. of the Combustion Inst., Salt Lake City, 12 Apr. 1982 Prepared in cooperation with Utah Univ., Salt Lake City
(Contract DE-FG22-80PC-30216)
(DE82-009791; CONF-820403-3) Avail: NTIS HC A03/MF A01

An experimental facility which consisted of an opposed flow burner, a fluidized bed particle feeder, and analyzers for particle velocity and gas composition determination, was developed for performing pulverized coal diffusion flame studies. The extent to which the flame is two dimensional under actual experimental condition was determined, and the rectangular opposed flow diffusion flame (OFDF) was assessed to determine if it may be a useful experimental tool for studying the combustion of pulverized coal. The design and operation of the test facilities are described. The test results showed that: the rectangular OFDF burner provides a long pathlength over which the temperature and composition remain constant, thus making it ideal for line of sight optical measurements; the temperature and composition of stable species varies almost exclusively with the distance perpendicular to the flame front, and the structure is similar to that of an axisymmetric OFDF. DOE

N83-24593# Oak Ridge Gaseous Diffusion Plant, Tenn. Nuclear Div.
NOBLE-GAS REMOVAL AND CONCENTRATION BY COMBINING FLUOROCARBON ABSORPTION AND ADSORPTION TECHNOLOGIES
D. K. Little, R. S. Eby, J. L. Norton, J. L. Patton, R. M. Schultz, and J. M. Varagona 4 Aug. 1982 22 p refs Presented at the 17th DOE Nucl. Air Cleaning Conf., Denver, 2-5 Aug. 1982
(Contract W-7405-eng-26)
(DE82-019469; K/PS-5002; CONF-820833-8) Avail: NTIS HC A02/MF A01

A fluorocarbon-based selective absorption system for removal of Kr-85 and (C-14)02 from nuclear fuel reprocessing facilities. Process performance and reliability were demonstrated with over 10 years of operation using simulated reactor and reprocessing plant dissolver off-gases and three generations of pilot plant scale equipment. A major development is a combination absorption and stripping column which results in a simplified process with improved reliability and lower cost. The process has shown excellent flexibility in simultaneously removing and concentrating the radioactive gases of interest, i.e., > 99% removal is easily obtainable for Kr, Xe, and CO2. With the incoming feed gas containing around 10 ppM Kr, the product concentration of Kr from the single column is typically in the 1 to 10% range. Additional purification of the single column product allows nearly pure components (> 90% Kr) to be obtained, thereby minimizing final storage or disposal requirements. DOE

N83-24594# Minnesota Univ., Minneapolis. Dept. of Chemical Engineering.
CONTINUOUS CHEMICAL-REACTION CHROMATOGRAPHY Progress Report, 1 Feb. 1981 - 15 Jan. 1982
R. Aris and R. W. Carr, Jr. 1982 31 p
(Contract DE-AS02-76ER-02945)
(DE82-010447; DOE/ER-02945/5) Avail: NTIS HC A03/MF A01

The following research programs were completed; (1) countercurrent chromatographic reactor with first order surface; (2) continuous rotating annual chromatographic reactor; and (3) microcatalytic reactor study of the dehydration of tert-butanol over alumina. The experimental study of a moving bed chromatographic reactor and the theory of countercurrent moving bed are discussed. Catalytic hydrogenation of benzene and mistylene were undertaken and the possible reactions were studied in the moving bed chromatographic reactor. DOE

N83-24595# California Univ., Livermore. Lawrence Livermore Lab.
URANIUM FROM SEAWATER
David Gregg and Michael Folkendt 21 Sep. 1982 39 p refs
(Contract W-7405-eng-48)
(DE83-000658; UCID-1969) Avail: NTIS HC A03/MF A01

A process for recovering uranium from seawater is proposed and some of the critical technical parameters are evaluated. The process, in summary, consists of two different options for contacting adsorbant pellets with seawater without pumping the seawater. It is expected that this will reduce the mass handling requirements,

compared to pumped seawater systems, by a factor of approximately 1,000, which should also result in a large reduction in initial capital investment. Activated carbon, possibly in combination with a small amount of dissolved titanium hydroxide, is expected to be the preferred adsorbant material instead of the commonly assumed titanium hydroxide alone. The activated carbon, after exposure to seawater, is stripped of uranium with an appropriate eluant (probably an acid) or is burned for its heating value (possible in a power plant) leaving the uranium further enriched in its ash. DOE

N83-24596# Massachusetts Inst. of Tech., Cambridge. Energy Lab.

CRITICAL STUDIES OF THE RAPID PYROLYSIS AND HYDROPYROLYSIS OF COAL Final Project Report, 1 Jan. 1977 - 30 Jun. 1982

Jack B. Howard and William A. Peters Sep. 1982 13 p

(Contracts DE-AT01-76ET-10693; EX-76-A-01-2295)

(DE83-000101; DOE/ET-10693/2295; FE-MIT-2295T26) Avail: NTIS HC A02/MF A01

The effects of reaction conditions on the rapid pyrolysis behavior of coal in inert and hydrogen atmospheres are summarized. The independent effects of final temperature (150 to 1100 C), reaction time at final temperature (0 to 30 s), heating rate (10 to 10,000 c/s), total pressure (0.0001 to 100 atm), hydrogen partial pressure (0 to 69 atm), and particle size (45 to 1000 microns), on product yields and compositions were determined for a Montana lignite and a Pittsburgh No. 8 Seam bituminous coal. Kinetic data were obtained for formation of specific pyrolysis products from each coal. A new mass transfer model for rapid hydrogasification of softening coal was also formulated. Effects of native mineral matter and selected inorganic additives on the pyrolysis behavior of the Pittsburgh Seam coal and of a Wyodak subbituminous coal were also studied. DOE

N83-24597# SRI International Corp., Menlo Park, Calif.

IDENTIFICATION AND CLEAVAGE OF BREAKABLE SINGLE BONDS BY SELECTIVE OXIDATION, REDUCTION, AND HYDROLYSIS Quarterly Report, 1 Apr. - 30 Jun. 1982

Albert S. Hirschon, John Zevely, and Frank R. Mayo Sep. 1982 41 p refs

(Contracts DE-AC22-78ET-11423; DE-22-81ET-11423)

(DE82-021276; DOE/ET-11423/T5; QR-15) Avail: NTIS HC A03/MF A01

The structure of bituminous coal was studied. The program began with studies of the fraction of Illinois No. 6 coal that is toluene-insoluble, pyridine-soluble (TIPS). Investigations of TIPS fractions, the preparation of a lot, their fractionation by gel permeation chromatography, and their oxidations by aqueous NaOCl and Ce(IV) is described. It is shown that benzylamine dissolves only 1.3% of the carbon in pyridine-extracted coal in 5 extractions (4h), but 7.3% in 16 days. A concentrated benzylamine extract was almost wholly soluble in pyridine. Increases in hydroxyl and amine groups when coal is extracted by N-containing solvents, are compared. Silylation of TIPS fractions soluble and insoluble in alcoholic KOH results in similar hydroxyl contents differing in molecular weight. Black acids were tested for diaryl ketone. A literature review indicates that in connecting links Ar-(CH2)/sub n/-Ar in coal liquefaction, n should be 2 or more. Pyridine extractions of nine coals are summarized. DOE

N83-24598# Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.

GAS CHARACTERIZATION FROM FLUIDIZED-BED COAL GASIFICATION Quarterly Report, 1 Mar. - 31 May 1982

D. F. Ciliberti, E. E. Smeltzer, N. T. Rohatgi, M. A. Alvin, D. L. Keairns, A. B. Turner, F. Lagonik, and D. Lojek 1982 43 p

(Contract DE-AC21-81MC-16024)

(DE82-021179; DOE/MC-16024/T3; QR-3) Avail: NTIS HC A03/MF A01

The characterization of the nature of alkali, trace metal, particulate, and hydrocarbon emissions in the hot fuel gas stream produced in a fluidized bed gasifier is proposed. The potential environmental and process implications of these emissions are sought. The characterization is to consist of determining the amounts of contaminants associated with the particulate emissions relative to the amounts and types of gaseous species. The particulate-associated contaminants will be further analyzed to determine their soluble and insoluble fractions as well as the particular species present. The primary method of sampling will be based on isokinetic extractive sampling. Upon analysis of the species and amounts of alkali, trace metal, and hydrocarbons found, attempts will be made to correlate the effects of feedstocks and operating parameters with these emissions. This will be used to develop a basis for projecting emission profiles in fluidized bed gasification processes. DOE

N83-24599# Physical Sciences, Inc., Andover, Mass.

EFFECTS OF PREIGNITION ON PULVERIZED-COAL COMBUSTION Quarterly Report, 1 Apr. - 30 Jun. 1982

Girard A. Simons, G. Kothandaraman, Steven P. Schertzer, and Mary Jane Palm 1982 60 p refs

(Contract DE-AC22-80PC-30293)

(DE82-020517; DOE/PC-30293/7; PSI-TR-334; QR-7) Avail: NTIS HC A04/MF A01

Pore structure optimization, is complete. The results predict that high reactivity chars require high porosities and a higher concentration of large pores. The experimental studies illustrate the dependence of these quantities on heating rate and final temperature. The data obtained for Texas Lignite suggest that porosity (hence reactivity) is strongly dependent on the final pyrolysis temperature with the maximum porosity occuring at 1300 K. The data also indicate that to a lesser extent, the heating rate affects pore structure. Higher heating rates increase the relative number of large pores and thus can enhance reactivity by a factor of two. Hence, the optimum pore structure for char reactivity may be obtained by preparing char at 1300 K and high heating rates (>1000 K/s). Such chars could be four times as reactive as chars prepared at 2000 K and 1 to 10 K/s. The theory of pore evolution is complete and was reported. DOE

N83-24600# Pittsburgh and Midway Coal Mining Co., Shawnee Mission, Kans.

LIQUEFACTION OF BITUMINOUS COALS WITH ADDED CATALYSTS

Sep. 1982 94 p refs

(Contracts DE-AC22-81PC-40005; DE-AC22-79ET-14800)

(DE83-000309; DOE/PC-40005/20) Avail: NTIS HC A05/MF A01

Catalyst addition studies were carried out during solvent refined coal (SRC) 1 and SRC 2 processing of bituminous coals. While these coals can generally be liquefied successfully in both modes of operation, the catalysts were added in an attempt to improve yields, product quality and operability. At 450 C, 2250 psig and 1.0 hour residence time in the SRC 2 mode with Loveridge coal, two hydrodesulfurization catalysts (NiMo and CoMo on alumina) and an ammonium molybdate emulsion increased total oil yield by 10 wt % (based on MF coal). Molybdenum added by aqueous impregnation of the coal, pyrite and ferric oxide each increased oil yield by about 6 wt %, while a ferrous sulfate emulsion had little effect. Distillate product analyses were not changed by the additives except for a reduction in sulfur with the molybdenum catalysts. There was a significant improvement in operability with all additives except the ferrous sulfate emulsion. DOE

N83-24601# Mobil Research and Development Corp., Paulsboro, N. J.

ANALYTICAL STUDIES FOR THE H-COAL PROCESS Final Report

M. Becker, J. G. Bendoraitis, M. G. Bloch, A. V. Cabal, R. B. Callen, L. A. Green, F. J. Hills, C. A. Simpson, and J. C. Trewella Jul. 1982 121 p refs

(Contracts DE-AC05-77ET-10112; EF-77-C-01-2676)

(DE82-019835; DOE/ET-10112/T1; FE-2676-8) Avail: NTIS HC A06/MF A01

H-coal Syncrude product streams, prepared from Illinois No. 6,

Wyodak, or West Kentucky No. 11 coal were obtained from the H-Coal Process Development Unit (PDU) and analyzed for physical properties, elemental compositions, trace metal levels, and molecular composition. The trace metal levels are generally low in all except the heavy fuel oils. Although the product streams bear some similarity to comparable petroleum streams, they differ in that, for example, the H-Coal non-aromatic cuts are more naphthenic, and the aromatic cuts account for a higher proportion of the streams. The naphthas contain predominently cyclic compounds which upon catalytic reforming should yield high octane gasoline. However, coal liquids contain significant amounts of highly polar compounds. In the naphthas these compounds are mainly phenols, anilines, and pyridines, which would need to be removed prior to use as gasoline. After storage for one year solids formed in all products, generally increasing with time and temperature. Naphtha gum levels also increased. Most of the other changes were relatively minor. DOE

N83-24602# Babcock and Wilcox Co., Alliance, Ohio. Research and Development Div.

COMPUTATIONAL TOOLS FOR PULVERIZED-COAL COMBUSTION Quarterly Report, Apr. - Jun. 1982

W. J. Oberjohn, D. K. Cornelius, W. A. Fiveland, R. J. Schnipke, and J. H. Wang Jan. 1982 26 p refs

(Contract DE-AC22-81PC-40265)

(DE82-021387; DOE/PC-40265/5; ARC-5274; QR-5) Avail: NTIS HC A03/MF A01

A computer code capable of modeling the major aspects of pulverized coal combustion was developed. Achieving this objective will lead to design methods applicable to industrial and utility furnaces. The combustion model consists of a number of relatively independent modules that represent the major processes involved in pulverized coal combustion. These modules will be continually upgraded. The initial evaluation of the gas phase models continued, the definition of the solid phase models was completed, and coding was initiated. A swirling flow, gas phase combustion evaluation run was completed and good agreement was obtained with predictions from a proprietary code based on similar models of the physics and chemistry. A nonswirling gas phase combustion run was completed. DOE

N83-24603# Kerr-McGee Corp., Oklahoma City.

APPLICATIONS OF MULTIPROPERTY ANALYSIS IN THE PREDICTION OF COMPLEX-SYSTEM THERMOPHYSICAL BEHAVIOR

Michael R. Brule and Kenneth E. Starling (Oklahoma Univ., Norman) 1982 43 p refs Presented at the AICHE Ann. Meeting on Heat and Energy Conversion, Los Angeles, 14-18 Nov. 1982

(Contract DE-FG22-80PC-30249)

(DE82-020859; CONF-821106-5) Avail: NTIS HC A03/MF A01

The Therm-Trans method is presented for predicting compound characterization parameters (e.g., critical properties) used in multiparameter corresponding-states correlations. The technique employs multiproperty analysis of thermodynamic and transport data. Most of the property data utilized is similar to the inspection data obtained for pseudocomponent fractions resolved from a standard TBP-distillation analysis of a complex organic mixture. These property data include vapor pressure, density, and viscosity-the analogues for fraction inspection data such as average boiling temperature, specific gravity, and kinematic viscosity. The new approach for determining correlation parameters altogether circumvents the need for critical-property data per se. Thermophysical property data for over fifty organic compounds, including high-molecular-weight linear hydrocarbons present in petroleum, and polycyclic organic compounds typical of coal-derived fluids, have been used to develop the property correlations and establish the feasibility of the characterization technique. DOE

N83-24604# California Univ., Livermore. Lawrence Livermore Lab.

METHOD FOR INITIATING AN UNDERGOUND COMBUSTION PROCESS

Donald S. Thompson and Dewey F. Skinner, Jr. 2 Jul. 1982 6 p refs Presented at the 8th Underground Coal Conversion Symp., Keystone, Colo., 15 Aug. 1982

(Contract W-7405-eng-48)

(DE82-020164; UCRL-87789; CONF-820840-2) Avail: NTIS HC A02/MF A01

The product of an effort at the Lawrence Livermore National Laboratory aimed at the initiation of a stable combustion process at either end of a process channel is a silane/propane ignition system that was taken through the design, testing, and field operation sequence, yielding an improvement in performance over previous techniques. Pyrophoric silane provides the ignition source, and propane (or methane) serves as the sustaining fuel to ignite the coal seam. The system performed satisfactorily at the base of vertical and horizontal wells in a coal seam; it was also used to ignite remotely a pilot burner in an incinerator. Other applications are being suggested. DOE

N83-24605# California Univ., Livermore. Lawrence Livermore Lab.

TECHNICAL UNDERGROUND-COAL-GASIFICATION SUMMATION: 1982 STATUS

D. R. Stephens, C. B. Thorsness, R. W. Hill, and D. S. Thompson Jul. 1982 20 p refs Presented at the 8th Underground Coal Conversion Symp., Keystone, Colo., 15 Aug. 1982

(Contract W-7405-eng-48)

(DE82-020160; UCRL-87689; CONF-820840-1) Avail: NTIS HC A02/MF A01

The eighteen field tests and ten years experience have demonstrated technical feasibility and allow several generalizations concerning underground coal gasification. For example, burns tend to be bowl shaped after roof collapse, since ash and slag (and high water content in coal) impede downward burning. Burns appear to be symmetrical in plan view, but not in elevation view. Injection and linking at the bottom of the seam can improve performance. Heat losses begin, and heating value declines, when burns reach the roof rock. In general, heating value and chemistry appear to be insensitive to operational parameters but are sensitive to process-well geometry and overburden. Underground coal gasification produces hot (up to 600 C) gas containing particulate, tar, and steam which must be dealt with. Most UCG process experience was in flat or gently dipping seams using the linked vertical well method. The steeply dipping bed geometry is favorable for UCG. The controlled retracting injection point method may alleviate many underground coal gasification problems. DOE

N83-24606# Oak Ridge National Lab., Tenn. Chemical Technology Div.

EVALUATION OF COKING BEHAVIOR IN COAL-LIQUEFACTION-PROCESS EQUIPMENT

K. H. Lin, G. C. Frazier (Tennessee Univ., Knoxville), and R. E. Edwards, Jr. (Tennessee Univ., Knoxville) 1982 8 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982 Submitted for publication

(Contract W-7405-eng-26)

(DE82-020831; CONF-820814) Avail: NTIS HC A02/MF A01

Formation/deposition of coke-like solids in process equipment represents one of the crucial problems in coal liquefaction processes, yet the causes for such behavior are not well understood. The results of the state of the art review in understanding coking behavior, with an emphasis on possible application to coking in coal liquids is presented. Preliminary dimensional correlations that resulted from a comprehensive analysis of the coking data from preheater test runs in the coal liquefaction pilot plant are also presented. The correlations indicate process conditions and certain coal characteristics that may lead to incipient coke formation. Further studies and additional data are required to refine these correlations. DOE

N83-24607# Mound Lab., Miamisburg, Ohio.

ULTRAFILTRATION/REVERSE OSMOSIS (LIQUID TREATMENT SYSTEMS)

William H. Bond 1982 43 p Presented at the 4th Ann. DOE LLWMP Participant's Inform. Meeting, Denver, 31 Aug. 1982

(Contract DE-AC04-76DP-00053)
(DE82-020775; MLM-2987-OP; CONF-820854-10) Avail: NTIS HC A03/MF A01

Low level liquid waste treatment processes are studied. Reverse osmosis (RO) was found to be an effective decontamination process with a large number of radioisotopes. A reverse osmosis development with a plant design for a 40 gal/min RO unit was concluded. Background and engineering data were included to enable an applicability assessment and rough cost estimate to be made. The removal of cobalt from aqueous solutions with adsorbents was investigated. It was found that solution pH, ammonium, and sulfite ions affect cobalt removal. The effect of these factors was measured and defined in a set of prediction equations. A design for an adsorbent pilot plant was also produced which included a process schematic, solution criteria, recommended isotope-adsorbent combinations, and cost estimates. DOE

N83-24608# SRI International Corp., Menlo Park, Calif.
EXPLORATORY STUDY OF COAL-CONVERSION CHEMISTRY Quarterly Report, 19 Feb. - 18 May 1982
David S. Ross, Donald F. McMillen, Walter C. Ogier, Ronald H. Fleming, and Georgina P. Hum Jun. 1982 50 p refs
(Contract DE-AC22-81PC-40785)
(DE82-020736; DOE/PC-40785/4; QR-4) Avail: NTIS HC A03/MF A01

SRI is conducting a program on the chemistry of the conversion of coal to liquid fuels: Task A deals with mechanisms of donor solvent liquefaction; Task B is a study of the conversion of coal and model compounds in the CO/H2O system. In Task A, determination of the products, rates and mechanisms of central bond scission of diphenyl ether and 1,2-dinaphthylmethane in tetralin, 9,10-dihydroanthracene, and 9,10-dihydrophenanthrene allows us to determine the predominant mechanism of hydrogen transfer to these substrates. Diphenyl ether decomposes in the above three solvents by a radical addition-elimination mechanism, with defined first-order rate constants of approx 1 x 10 to the minus 7th power, 2 x 10 to the minus 6th power, and 2 x 10 to the minus 7th power S(-1), respectively. The relative reactivity of the two substrates, the relative reactivity in the three solvents, and the positional preference for hydrogen transfer provide compelling evidence for the previously unreported single-step transfer of hydrogen from a radical to a closed-shell pi-system. Efforts in Task B were concentrated on the conversion of anisole in D2O and in tetralin at 400 C. DOE

N83-24609# Louisiana State Univ., Baton Rouge. Dept. of Chemistry.
SPECTROSCOPY AND PHOTOCHEMISTRY OF AROMATIC AND CYCLIC BETA-DIKETONES Ph.D. Thesis
Felipe Antonio Pascal H Aug. 1982 203 p refs
(Contract DE-AS05-76EV-03018)
(DE82-019298; DOE/EV-03018/T5) Avail: NTIS HC A10/MF A01

Beta-diketones exist in a tautomeric equilibrium between the enol and the keto forms. The enol form is the most stable because of the formation of an intramolecular hydrogen bond. Beta-diketones in solution at 77 K exhibit changes in their absorption and phos-phorescence spectra upon irradiation with a powerful uv-visible source. The changes observed in the molecule result from rupture of the intramolecular hydrogen bond. Once the hydrogen bond has been broken a distribution of conformers of the enol is possible. The formation of a negative ion can also result from the irradiation and a distribution of conformers of the negative ion is also possible. CNDO/S-2 calculations on aromatic beta-diketones were done in order to help understand the spectroscopy of these compounds. Cyclic beta-diketones were also investigated. The form which predominates is dependent upon the size of the ring (strain). The formation of an intramolecular hydrogen bond in some cyclic beta-diketones is not possible. DOE

N83-24610# Exxon Nuclear Idaho Co., Inc., Idaho Falls. Idaho Chemical Processing Plant.
AUTOIGNITION OF KEROSENE IN FLUIDIZED-BED PILOT-PLANT CALCINERS
R. J. Ramer Jan. 1982 75 p refs
(Contract DE-AC07-79ID-01675)
(DE82-008764; ENICO-1106) Avail: NTIS HC A04/MF A01

Studies were conducted to determine minimum autoignition temperatures of kerosene in 15-cm and 30-cm diameter in-bed combustion pilot plant fluidized-bed calciners. Limits of flammability were calculated to ensure safe operating conditions while testing various bed materials. Recommendations for pilot-plant and New Waste Calcining Facility operation are made based on the pilot-plant studies. DOE

N83-24611# Ohio State Univ., Columbus. Dept. of Chemistry.
PROGRAM WINDOW
Richard J. Laub Aug. 1982 52 p refs
(Contract DE-AC02-80ER-10554)
(DE82-020760; DOE/ER-10554/99-Rev-1) Avail: NTIS HC A04/MF A01

The program described was written for the reduction of retention data encountered in liquid chromatography. The program considers that log (solute retentions) vary in a linear fashion with LC mobile phase composition. However, any function (e.g., quadratic, etc.) could easily be substituted and the program will perform equally as well. A particularly important feature of the program comprises a loop which identifies the relevant pairs of solutes (within a given value of inputted alpha) which are used subsequently to calculate the window diagram boundary. The program run time is consequently shortened by at least a factor of five over previously used brute force techniques (all possible pairs considered at each column composition). The required CPU space reserved for arrays is also thereby diminished considerably. The program was written on and for an APPLE II Plus system; statements not compatible with other modern versions of BASIC are pointed out and discussed. DOE

N83-24612# Ohio State Univ., Columbus. Dept. of Chemistry.
FABRICATION AND EVALUATION OF GAS-CHROMATOGRAPHIC SYSTEMS OF HIGH EFFICIENCY WITH CONCOMITANT HIGH SELECTIVITY BS Thesis
William L. Roberts and Richard J. Laub Aug. 1982 81 p refs Sponsored in part by NSF and Dow Chemical Co.
(Contract DE-AC02-80ER-10554)
(DE82-020758; DOE/ER-10554/24) Avail: NTIS HC A05/MF A01

Glass capillary columns which provide high efficiency and short analysis times can be fabricated by decreasing the inner column diameter. The sample capacity of the column used with a G C equipped with a flame ionization detector dictates the lower limit of usable diameters. The inlet pressure required to produce the optimum linear velocity increases rapidly with decreasing column diameter. Such an instrument equipped with a 25m 35 microns column would be useful for separating rapidly complex hydrocarbon mixtures. Nematic mesogenic polymers were prepared which were highly selective for polynuclear aromatic hydrocarbons. Three of these polymers exhibited nematic phases in the temperature range required for separating compounds commonly encountered in environmental analyses. The selectivity of these phases can be modified by blending with a boiling point stationary phase such as SE-52. The optimum stationary phase composition for a specific separation can then be determined with a window diagram. DOE

N83-24613# Ohio State Univ., Columbus. Dept. of Chemistry.
NOVEL MESOGENIC POLYSILOXANE SOLVENTS FOR GAS-LIQUID CHROMATOGRAPHY
H. Finkelmann and Richard J. Laub Aug. 1982 22 p refs
(Contract DE-AC02-80ER-10554)
(DE82-020753; DOE/ER-10554/25) Avail: NTIS HC A02/MF A01

The open tubular column gas chromatographic properties of a member of a class of mesogenic polysiloxane phases are described and compared with those of a polymethylphenylsiloxane solvent. The former is shown to yield high column efficiency commensurate with its gum like character, yet concomitant high selectivity for

positional isomers of methylchrysenes and for polycyclic aromatic and sulfur heteronuclear compounds. The nematic/isotropic temperature range of the phase, 70 to 300 C, exceeds by several factors those of liquid/crystal stationary solvents, as does its upper useful temperature limit of 300 C. DOE

N83-24614# California Univ., Livermore. Lawrence Livermore Lab.
MICROSPECTROSCOPY
Tomas Hirschfeld 1 Jul. 1982 19 p refs Presented at the Am. Microbeam Soc. 16th Ann. Meeting, Washington, D.C., 12 Aug. 1982
(Contract W-7405-eng-48)
(DE82-020158; UCRL-87780; CONF-820807-3) Avail: NTIS HC A02/MF A01

The boom in electron and ion microbeam methods, with its overwhelming proliferation of new methods (and acronyms) and eager exploitation of every available technological advance, has tended to obscure the very wide usage of the corresponding optical methods. These outgrowths of the enormous field of visual optical microscopy are, however, quite alive and kicking, and their unique capabilities are becoming more appreciated as more and more advanced optical technology is applied to the field. This review of optical microprobe techniques includes uv-VIS absorption techniques, fluorescence microspectroscopy, Raman measurements, and other microprobes such as the infrared ones, scatter, and the various partially optical methods. Also discussed are technological advances that may impact these fields. The natural place of microspectroscopy is shown to be as a higher discrimination, lower resolution companion of electron and ion beam microprobes. DOE

N83-24615# GCA Corp., Bedford, Mass. Technology Div.
MATERIAL BALANCE IN ATMOSPHERIC FLUIDIZED-BED COMBUSTION OF NORTH DAKOTA LIGNITE
Robert R. Hall, Mark M. McCabe, and Deborah McGrath Mar. 1982 134 p refs
(Contract DE-AC18-81FC-10281)
(DE82-020853; DOE/FC-10281/1) Avail: NTIS HC A07/MF A01

The distribution of 24 trace and minor elements in the feed and exit streams from a fluidized bed combustor equipped with a pulse jet baghouse for particulate control was investigated. Lignite feed was the major source of aluminum, barium, beryllium, iron, sodium and titanium entering the combustor. The limestone feed was the major source of calcium, magnesium and manganese entering the combustor. Both lignite and limestone were significant sources of chromium, cobalt, nickel, potassium, silicon, vanadium and zinc. Most of the elements left the combustion system in either the primary cyclone catch or the bed drain. The secondary cyclone and baghouse collected most of the remaining trace and minor elements. Particulate emissions to the atmosphere were very low ranging from 0.00026 to 0.00040 lb/million Btu. Emissions of trace and minor elements, which were also very low, are presented. DOE

N83-24616# Babcock and Wilcox Co., Alliance, Ohio. Research and Development Div.
ELECTROCHEMICAL BEHAVIOR OF FERROUS AND FERRIC IONS IN EDTA/N2H4 SOLUTIONS
C. M. Chen and J. M. Jevec Oct. 1982 30 p refs Sponsored in part by EPRI and Steam Generator Owners Group
(EPRI Proj. S127-1)
(DE83-900751; EPRI-NP-2701) Avail: NTIS HC A03/MF A01

Laboratory testing was conducted and electrochemical measurements were made to develop an understanding of the conditions controlling the behavior of ferric (Fe+3) and ferrous (Fe+2) ions in solutions of ethylenediaminetetraaceticacid (FDTA) and hydrazine (N2H4). Such solutions are considered for use in the chemical removal of magnetite (Fe3O4) deposits from the secondary side of pressurized water reactor (PWR) steam generators. DOE

N83-24617# Pennsylvania State Univ., University Park. Dept. of Chemistry.
DYNAMICS, ENERGETICS, AND STRUCTURE OF MICROCLUSTERS: ELUCIDATING THE PHYSICAL BASIS FOR CATALYSIS AND SURFACE CHEMISTRY, REACTIONS IN CONDENSED PHASES, AND AEROSOL-PARTICLE FORMATION Final Technical Report
A. W. Castleman, Jr. 1982 42 p refs
(Contract DE-AC02-82ER-60055)
(DE83-003804; DOE/ER-60055/1) Avail: NTIS HC A03/MF A01

Progress is reported on the mechanisms of small particle formation and on a study of the properties of small clusters, the mechanisms by which prenucleation embryos are formed, and the changing properties of systems undergoing the transformation from the gaseous to the condensed state. The results contribute to an understanding of a wide variety of fundamental problems including nucleation phenomena, the nature and stability of the aerosol state, the formation, structure and reactivities of surfaces, the kinetics of association and unimolecular reactions, energy transfer, and solvation phenomenon. DOE

N83-24618# Midwest Research Inst., Kansas City, Mo. Energy and Materials Science Dept.
FUTURE AVAILABILITY OF CATALYST METALS FOR SYNFUEL PROCESSES Final Report
Shuji Mori and A. D. McElroy 1982 77 p refs
(Contract DE-AC01-81ER-30015; MRI Proj. 7265-G)
(DE82-015628; DOE/ER-30015/T1) Avail: NTIS HC A05/MF A01

The availability of catalyst metals for the manufacture of synthetic fuels from coal, oil shale, and tar sands was investigated. The commercialization of various processes for producing synthetic fuels in terms of their impact on the consumption of catalyst materials was investigated, using a standard 50,000-BPD plant or a 300 million-SCFD substitute natural gas (SNG) plant as a basis for comparison. These results were then scaled up to national replacement levels of 6 million BPD synthetic crude oil and 10 billion SCFD of SNG. These figures would correspond to a 40% replacement of petroleum and a 20% replacement of natural gas at current consumption rates. The major catalyst metals required for a synthetic fuels industry would include cobalt, molybdenum, nickel, iron, chromium, and tungsten, with minor amounts of the platinum and rare earth group metals. Certain options were found to be at least technically feasible; molybdenum alone can be used to catalyze the direct liquefaction of coal, and an alloy of iron and titanium can be used as a methanation catalyst to replace nickel. DOE

N83-24619# Johns Hopkins Univ., Baltimore, Md. Dept. of Chemistry.
IONIC ASPECTS OF SOOT FORMATION Progress Report
Walter S. Koski Aug. 1982 8 p
(Contract DE-AC02-81ER-10970)
(DE82-020799; DOE/ER-10970/1) Avail: NTIS HC A02/MF A01

Studies of hydrocarbon flames indicate that ions play an important role in the process of soot formation. Scientists who have studied the ionic aspects of soot formation have proposed complex schemes involving many ion-molecule reactions. However, since most of the candidate ion-molecule reactions have not been studied a sound interpretation of much of the combustion data involving ion-molecule reactions is not possible. The objective of this program is to study as many of the ion-molecule reactions as possible and correlate these results with reported combustion results. In this report reactions of the following are discussed; reactions of H3O(+) with benzene; reactions of D3O(+) with naphthalene; reactions of CHO(+) with benzene; reactions of C3H3(+) with acetylene. Ion beam techniques and tandem mass spectrometers were used in this study. Charge transfer and proton transfer reactions involving aromatic products were also investigated. DOE

N83-24620# Bendix Corp., Kansas City, Mo.
AN ANALYSIS OF ELECTROCHEMICAL DEBURRING Final Report

L. K. Gillespie and W. M. Moore Sep. 1982 154 p refs
(Contract DE-AC04-76DP-00613)
(DE82-020881; BDX-613-2818) Avail: NTIS HC A08/MF A01

Electrochemical deburring (ECD) is being used successfully to finish precision miniature parts. Process success requires consistent burr size, relatively precision tools, and careful choice of parameters. The product voltage x time is the principle variable in determining amount of material removed from edges. Burr volume as opposed to burr height or burr thickness is the most significant burr variable. Twelve process side effects are noted. The side effects generally are controllable or of little concern on many parts. Economics, tool design, and machining aspects of ECD are discussed. DOE

N83-24621# Pacific Northwest Lab., Richland, Wash.
CHEMICAL CHARACTERIZATION AND GENOTOXIC POTENTIAL RELATED TO BOILING POINT FOR FRACTIONALLY DISTILLED SRC-1 COAL LIQUIDS
B. W. Wilson, R. A. Pelroy, and D. D. Mahlum Jul. 1982 68 p refs
(Contract DE-AC06-76RL-01830)
(DE82-019722; PNL-4277) Avail: NTIS HC A04/MF A01

Selected research efforts oriented toward ameliorating the genotoxic potential of direct coal liquefaction materials through modification or optimization of process conditions are discussed. The studies were conducted to evaluate the utility of optimized distillation for coal liquids from the SRC-1 process. Reverse mutation with the Ames tester strain TA98 demonstrated that mutagens were concentrated in the bp cuts boiling above 700 F. For this tester strain most of the genetic activity in these distillates was attributable to chemical fractions enriched in APAH having 3 or more rings. Mutagenicity data obtained with TA98 was in good agreement with sk in carcinogenesis results from the mouse-skin initiation/promotion (in vivo) test system. Results of initiation/promotion experiments used to measure the relative potency of bp cuts as initiators of mouse skin carcinogenesis again showed fractions boiling above 750 F. DOE

N83-24622# SRI International Corp., Menlo Park, Calif.
IDENTIFICATION AND CLEAVAGE OF BREAKABLE SINGLE BONDS BY SELECTIVE OXIDATION, REDUCTION AND HYDROLYSIS Quarterly Report, 1 Oct. - 31 Dec. 1981
Albert S. Hirschon, John Zevely, and Frank R. Mayo 26 Feb. 1982 22 p
(Contract DE-AC22-78ET-11423)
(DE82-011870; DOE/ET-11423/T3; QR-13) Avail: NTIS HC A02/MF A01

Bituminous coal is assumed to consist mostly of aggregates of condensed aromatic and aliphatic rings which are connected and made soluble by crosslinks containing single bonds. The structure of bituminous coal with emphasis on the crosslinks and breakable single bonds was determined. During this past quarter the following studies were conducted on Illinois No. 6 coal: extraction with benzylamine (BnH2), ethanolamine, ethylenediamine (EDA), pyridine; saponification of some toluene insoluble, pyridine soluble (TIPS) fraction; cleavages by amines; oxidation with aqueous NaOCl of butylated and methylated pyridine extracted coal; decarboxylation on black acids. The investigations dealt with two kinds of connecting links in coal, which are designated as ester and ether groups. The ester groups are cleaved by strongly basic amines (to give amides) at 25 C and by alcoholic KOH at 100 C (to give salts and alcohols or phenols). DOE

N83-24623# Ames Lab., Iowa.
DEVELOPMENT OF AN EFFICIENT COAL-DESULFURIZATION PROCESS: OXY-ALKALINOLYSIS
Tetsuo Aida, Clifford G. Venier, and Thomas G. Squires (Advanced Fuel Research) Sep. 1982 7 p refs Presented at the Am. Chem. Soc. Symp. on Coal Liquefaction, Kansas City, Mo., 1 Sep. 1982
(Contract W-7405-eng-82)
(DE82-016384; IS-M-382; CONF-820909-5) Avail: NTIS HC A02/MF A01

The concept of first oxidizing the sulfur from coal and then exploiting the enhanced chemical reactivity of functional groups such as sulfoxides, sulfones, and sulfonic and sulfinic acids to design a coal desulfurization process is discussed. This approach is based on the facile oxidation of organic sulfur by electrophilic reagents and the cleavage of C-SOx bonds by molten alkali. The process is best described as oxy-alkalinolysis. Conclusions are that this desulfurization method was developed on the basis of the demonstrated chemistry of organic sulfur functionalities; organic sulfur in coal can be activated with Cl2 for removal by molten KOH, probably through electrophilic oxidation; oxy-alkalinolysis is a method for deep cleaning of coal, i.e., efficient removal of organic sulfur, under mild conditions; and residual chlorine can be removed from coal with molten KOH. DOE

N83-24624# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DEVELOPMENT AND APPLICATION OF ANALYTICAL TECHNIQUES TO CHEMISTRY OF DONOR SOLVENT LIQUEFACTION Final Report, 1 Jan. 1980 - 31 Dec. 1981
H. C. Dorn and L. T. Taylor 1982 82 p refs
(Contract DE-AC22-80PC-30041)
(DE82-012255; DOE/PC-30041/T8) Avail: NTIS HC A05/MF A01

Analytical techniques for the characterization of coal conversion products were developed and applied. Solvent refined coal and process solvents derived therefrom served as the coal derived material for the duration of the study. The investigation were focused primarily in the areas of inductively coupled plasma atomic emission spectrometry (ICP-AES) and nuclear magnetic resonance spectroscopy (NMR). Highlights of the twenty-four month study are: trace metal analyses of ashed SRC fractions via ICP-AES; ICP-AES as a multielement detector in gel permeation chromatography; GPC-ICP-AES applied to SRC fractions; ICP-AES detection in normal phase chromatography; LC-1H NMR applied to a high field NMR system; LC-1H NMR analysis of coal recycle solvents; fluorine reagents examined for speciating heteroatoms in SRC; application of p-fluorobenzoyl chloride reagent to model samples; and application of the p-fluorobenzoyl chloride reagent to SRC fractions. DOE

N83-24625# Massachusetts Inst. of Tech., Cambridge. Dept. of Chemical Engineering.
CATALYTIC HYDRODENITROGENATION OF QUINOLINE IN A TRICKLE-BED REACTOR. COMPARISON WITH VAPOR-PHASE REACTION Quarterly Report, 1 May - 31 Jul. 1982
Charles N. Satterfield and Shan Hsi Yang 1982 113 p refs
(Contract DE-AC22-80PC-30075)
(DE82-019424; DOE/PC-30075/10) Avail: NTIS HC A06/MF A01

Studies at 350, 375, and 390 C, and 6.9 MPa showed that the presence of H2S (generated in situ from CS2) in the overall reaction network somewhat inhibits hydrogenation and dehydrogenation reactions but markedly accelerates hydrogenolysis reactions, for a net increase in the overall rate of hydrodenitrogenation (HDN). These effects are similar to those observed previously in vapor-phase reactions. H2S has little effect on the activation energies for the hydrogenation and dehydrogenation reactions, but significantly reduces those for the hydrogenolysis reactions. Certain plugging problems encountered upon reacting 5,6,7,8 tetrahydroquinoline are attributed to formation of a trimer imine as an intermediate. DOE

N83-24626# United Technologies Corp., South Windsor, Conn.
EFFECT OF GASIFIER-FEED-RATE VARIATIONS ON COAL-GAS-COMBUSTION CHARACTERISTICS Final Report
T. J. Gilmartin, F. S. Kemp, J. P. Grant, and G. N. Richter May 1982 112 p refs Sponsored by EPRI Prepared in cooperation with Pratt and Whitney Aircraft and Texaco, Inc.
(EPRI Proj. 985-1)
(DE82-905367; EPRI-AP-2216) Avail: NTIS HC A06/MF A01

Combined-cycle industrial gas turbines fired on coal-derived gaseous fuels will play an important role in future electric power

generation. Conventional, diffusion-flame type, gas turbine combustors can successfully burn lower heating value (LHV) gases with only minor modifications. However, the peak flame temperatures which result from the combustion of medium heating value (MHV) gases in these combustors are comparable to natural gas, resulting in undesirably high concentrations of NO/sub x/. Combustors incorporating new design schemes optimized for use with MHV gases have been tested and were found capable of meeting Environmental Protection Agency (EPA) NO/sub x/ requirements without water injection. The purpose of this program was to confirm these early data by operating previously evaluated combustors during an extended series of gasifier test programs. DOE

N83-24627# International Coal Refining Co., Birmingham, Ala.
SRC-1 COAL-LIQUEFACTION DEMONSTRATION PLANT PROJECT BASELINE ASSESSMENT REPORT
Apr. 1982 547 p
(Contract DE-AC05-78OR-03054)
(DE82-013863; DOE/OR-03054/T11) Avail: NTIS HC A23/MF A01

A comprehensive project baseline for the SRC-1 demonstration project is presented. The baseline provides the information necessary for Congressional decisions relating to the extent of government participation in, and support of, the project in the detailed design, construction and operation phases. The project baseline is a documented reference position for controlling work and cost. It is made up of a documented design configuration, a documented estimate to perform the work, and a detailed schedule of the activities required to complete the project. All elements of the project baseline were developed within the constraints of the project criteria. The Project Baseline was reviewed for reasonableness, completeness, quality, and consistency. DOE

N83-24628# Engelhard Industries, Inc., Edison, N.J. Research and Development Dept.
BENCH-SCALE DEVELOPMENT OF CATALYSTS FOR REFORMING AROMATIC AND HETEROCYCLIC HYDROCARBONS Final Report, Feb. 1980 - Feb. 1982
E. W. Stern Apr. 1982 273 p refs
(Contract DE-AC01-79ET-11029)
(DE82-015422; DOE/ET-11029/1191) Avail: NTIS HC A12/MF A01

This program was directed toward development of catalysts for the upgrading of uncovered pyrolysis products and volatiles formed in coal gasification to synthesis gas. Work performed consisted of catalyst preparation, characterization of fresh and spent catalysts, catalyst screening, and aging studies under increasingly severe conditions. Included in characterization of fresh catalysts were determinations of hydrothermal stability and studies of resistance to coking and sulfiding. Results of work in this program are reported. Findings support the conclusion that sulfur poisoning is the major cause of catalyst deactivation. Nickel and ruthenium catalysts were found to deactivate rapidly at inlet sulfur concentrations as low as 2 vppM. In contrast, excellent stability was displayed by platinum and rhodium catalysts at inlet sulfur levels > or = 40 ppM and 150 to 200 ppM, respectively. Support and metal sintering can be managed by the proper selection of materials and preparative variables. DOE

N83-24629# Oak Ridge National Lab., Tenn.
DESALTING SEAWATER AND BRACKISH WATERS: 1981 COST UPDATE
S. A. Reed Aug. 1982 50 p refs
(Contract W-7405-eng-26)
(DE82-020482; ORNL/TM-8191) Avail: NTIS HC A03/MF A01

Cost data are reported for desalting seawater by various distillation systems and by reverse osmosis. Costs of desalting four brackish waters, representative of those found in the United States by both reverse osmosis and electrodialysis are also given. Cost data are presented parametrically as a function of energy cost and plant size. The cost of desalting seawater by distillation has increased by 40% during the past two years, while desalting by reverse osmosis has increased by about 36% during the same period. Brackish water desalting by reverse osmosis has only increased by about 12%, and brackish water desalting by electrodialysis is up by 40%. Again, the continued increase in energy costs has had a major impact on all desalination systems. DOE

N83-24630# Lehigh Univ., Bethlehem, Pa. Center for Surface and Coatings Research.
CATALYSTS FOR ALCOHOLS FROM BIOMASS
K. Klier, R. G. Herman, and G. W. Simmons 8 Nov. 1982 12 p refs Presented at the Alcohols Fuels Program Contractors Meeting, Golden, Colo., 8 Nov. 1982
(Contract DE-AC02-80CS-83001)
(DE83-003611; DOE/CS-83001/T1) Avail: NTIS HC A02/MF A01

The development of catalysts for direct synthesis of light alcohols from synthesis gas produced by gasification of biomass was analyzed. The specific goals are: (1) to determine the factors influencing the varying performance of copper based catalysts for methanol in feedstocks with varying concentrations of carbon dioxide; and (2) to develop catalysts for the synthesis of C2-C4 alcohols by such modifications of the methanol synthesis catalysts that promote carbon-carbon bond formation among the monocarbon intermediates. It is indicated that the reverse water gas shift reaction occurred, along with the methanol synthesis reaction. The influence of water in the inlet synthesis gas on the methanol yield is investigated. A comparison of the CO2 experiments with the preliminary data obtained from the H2O addition indicates that water behaves as a more effective promoter at low concentrations and as a more severe retardant at high concentrations than carbon dioxide at comparable conditions. DOE

N83-24631# Rockwell International Corp., Golden, Colo. Energy Systems Group.
PROCESS FOR PRACTICALLY COMPLETE REMOVAL OF HYDROGEN SULFIDE FROM LOW-PRESSURE GASES
Yasuhiro Kobayashi Dec. 1982 16 p Transl. into ENGLISH from Japanese Kokai Patent Publication No. Sho 49-37895, 8 Apr. 1974 16 p
(Contract DE-AC04-76DP-03533)
(DE83-005022; RFP-Trans-365) Avail: NTIS HC A02/MF A01

A process is claimed for removal of hydrogen sulfide from low-pressure gases which involves bringing an aqueous solution of ferrates and ferrites of alkali metals such as sodium, potassium, etc. in contact with a low-pressure gas containing hydrogen sulfide in order directly to oxidize the hydrogen sulfide to sulfur; recovery of the sulfur; rough regeneration of the absorption liquid in an initial regeneration step by bringing it into contact with air having a low oxygen content and resulting from use in the subsequent step of complete regeneration of the solution; return of the major part of this roughly regenerated solution to the middle stage of the absorption tower; transportation of part of the roughly regenerated solution to a solution-regenerating tower which constitutes the step of complete solution regeneration, in which the solution will be almost completely regenerated by being brought into contact with fresh air having a high oxygen content; transportation of the resulting air with low oxygen content for reuse in the previously mentioned rough regeneration step; and transportation of the almost completely regenerated solution to the upper stage of the absorption tower in order ultimately to remove hydrogen sulfide from the gas. DOE

N83-24632# Bendix Corp., Kansas City, Mo.
APPLICATIONS OF ION CHROMATOGRAPHY Final Report
R. E. Smith Jan. 1983 18 p refs
(Contract DE-AC04-76DP-00613)
(DE83-004942; BDX-613-2865) Avail: NTIS HC A02/MF A01

A broad working knowledge of the principles of ion chromatography (IC) was achieved. The capabilities of the ion chromatograph used are established. Analytical methods are developed. They include: (1) determination of fluoroboric acid in boron powders; (2) determination of ammonia in Ablefoam; (3) determination of chloride in chlorinated organic solvents; (4) determination of chloride in gold dequest solutions; (5) determination of chloride in

sulfuric acid plating baths and in sodium hydroxide; (6) determination of tartarate, acetate, and formate in aluminum anodizing baths; and (7) elemental analysis of organic compounds and polymers by Parr Bomb combustion followed by IC. DOE

N83-24633# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

ELECTROCHEMISTRY APPLIED TO THERMAL CONVERSION

Helena L. Chun and Stuart Black Nov. 1982 30 p refs (Contracts DE-AC02-77CH-00178; EG-77-G-01-4042) (DE83-005212; SERI/PR-234-1850) Avail: NTIS HC A03/MF A01

Systems with a reversal of potential near room temperature were investigated for the direct conversion of low grade heat into electricity in an electrochemical heat engine, Carnot cycle limited in efficiency. Electrode reactions were selected which lead to large opposite isothermal temperature coefficients of the electrode potentials under practical battery operating conditions. Two basic types of regeneration are under consideration: systems that generate power at T/sub 1/ and that are regenerated at higher temperature and systems that generate power at T/sub h/ and that are regenerated by cooling. In order to vary the electrode potentials, complex formation was utilized. Twelve electrode reactions involving redox couples of iron (III)/iron(II) and copper (II)/copper and a variety of simple ligands and mixed ligands were investigated in aqueous and acid media. Several of the electrode reactions display large and opposite isothermal temperature coefficients, but the final TRES configuration requires an ion exchange separator. DOE

N83-24983# California Univ., Berkeley. Lawrence Berkeley Lab.

PRELIMINARY DETERMINATION OF THE *AI(OH) SUB 4* STABILITY CONSTANTS IN THE AQUEOUS PHASE AT ELEVATED TEMPERATURES

J. M. Neil and J. A. Apps *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 155-157 refs (For primary document see N83-24933 14-42) Avail: NTIS HC A09/MF A01

N83-24992# California Univ., Berkeley. Lawrence Berkeley Lab.

UNIQUE DEVELOPMENTS IN LASER-INDUCED FLUORESCENCE FLUORIMETRY (LIFF)

S. M. Klainer, H. R. Bowman, J. Conway, T. Hirschfeld, and F. Milanovich *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 180-182 refs (For primary document see N83-24933 14-42) Avail: NTIS HC A09/MF A01

N83-25065# MPD Technology Corp., Wyckoff, N.J. Ergenics Div.

METAL HYDRIDE PROCESS FOR HYDROGEN RECOVERY

E. Lee Huston *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 64-69 refs (For primary document see N83-25057 14-44) Avail: NTIS HC A17/MF A01

N83-25066# General Electric Co., Wilmington, Mass.

RECOVERY OF HYDROGEN FROM HYDROGEN SULFIDE

Gopala N. Krishnan and Donald L. Hildenbrand *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 71-74 refs (For primary document see N83-25057 14-44) Avail: NTIS HC A17/MF A01

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-24634*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

A COMPREHENSIVE ANALYSIS OF CAVITATION AND LIQUID IMPINGEMENT EROSION DATA

P. Veerbhadra Rao and S. G. Young 1983 18 p refs Proposed for presentation at 2nd Conf. on Cavitation, Edinburg, 6-8 Sep. 1983; Sponsored by Institute of Mechanical Engineers (NASA-TM-83352; E-1388; NAS 1.15:83352) Avail: NTIS HC A02/MF A01 CSCL 11F

Cavitation-erosion experimental data previously covering several materials tested in a rotating disk device and a magnetostriction apparatus were analyzed using new normalization and curve-fitting techniques. From this process a universal approach is derived which can include data from cavitation and liquid impingement studies for specific materials from different test devices. Author

N83-24635*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TRIBOLOGICAL AND MICROSTRUCTURAL CHARACTERISTICS OF ION-NITRIDED STEELS

T. Spalvins 1983 12 p refs Presented at the Intern. Conf. on Met. Coatings, San Diego, Calif., 18-22 Apr. 1983; sponsored by Am. Vacuum Soc. (NASA-TM-83368; E-1609; NAS 1.15:83368) Avail: NTIS HC A02/MF A01 CSCL 11F

Three steels AISI 4140, AISI 4340 and AISI 304 stainless steel were ion nitrided in a plasma consisting of a 75:25 mixture of H2:N2, sometimes with a trace of CH4. Their surface topography was characterized by SEM and two distinct compound phases were identified: the gamma and the epsilon. The core-case hardness profiles were also established. The low Cr alloy steels have an extended diffusion zone in contrast to the 304 stainless steels which have a sharp interface. The depth of ion-nitriding is increased as the Cr content is decreased. Friction tests reveal that the gamma surface phase has a lower coefficient of friction than the epsilon phase. The lowest coefficient of friction is achieved when both the rider and the specimen surface are ion nitrided. S.L.

N83-24636*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

EFFECT OF OXYGEN CONCENTRATION IN ZDP CONTAINING *OILS ON SURFACE COMPOSITION AND WEAR*

William A. Brainard and John Ferrante Apr. 1983 12 p refs (NASA-TM-83000; E-1436; NAS 1.15:83000) Avail: NTIS HC A02/MF A01 CSCL 11F

A pin-on-disk wear study was performed with the lubricants dibutyl sebacate (DBS) and mineral oil (MO) with and without 1 weight percent zinc-dialkyl-dithiophospatee (ZDP) as an additive. The pin was annealed pure iron and the disk was M-2 tool steel. The selected load and speed guaranteed boundary lubrication. The ambient atmospheric oxygen concentration in an oxygen-nitrogen mixture was varied from 0 percent to 20 percent in order to examine its relationship to ZDP effectiveness. Auger electron spectroscopy combined with argon ion bombardment (depth profiling) was used to determine surface elemental composition on the pin when tested in DBS with and without ZDP. The ambient atmosphere was found to cause large variations in wear rate and surface composition. With MO, ZDP reduced wear under all conditions, but had little advantage over oxides formed at 20 percent oxygen atmosphere. With DBS, ZDP reduced wear at 0 percent oxygen, but gave varied results at other oxygen concentrations. Depth profiling revealed sulfuide formation at 0 percent oxygen and probably sulfates at 20 percent oxygen. The results are significant because varied oxygen concentrations can occur under actual lubricating conditions in practical machinery. Author

N83-24637*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

TIME EFFECT OF EROSION BY SOLID PARTICLE IMPINGEMENT ON DUCTILE MATERIALS

P. Veerabhadra Rao and Donald H. Buckley Apr. 1983 18 p refs Proposed for presentation at the 6th Intern. Conf. on Erosion by Liquid and Solid Impact, 4-8 Sep. 1983, Cambridge, England;

sponsored by Cavendish Lab.
(NASA-TM-83369; E-1592; NAS 1.15:83369) Avail: NTIS HC A02/MF A01 CSCL 11F

Erosion and morphological studies of several metals and alloys eroded by normal impingement jets of spherical glass beads and angular crushed-glass erodent particles were conducted. Erosion morphology (the width, depth, and width-depth ratio of the pit) was studied in order to fully investigate the effect of time on erosion rate. The eroded surfaces were studied with a scanning electron microscope, and surface profiles were measured with a profilometer. A large amount of experimental data reported in the literature was also analyzed in order to understand the effect of variables such as the type of device, the erodent particle size and shape, the impact velocity, and the abrasive charge on erosion-rate-versus-time curves. In the present experiments the pit-width-versus-time or pit-depth-versus-time curves were similar to erosion-versus-time curves for glass-bead impingement. The pit-depth-rate-versus-time curves were similar to erosion-rate-versus-time curves for crushed-glass impingement. Analysis of experimental data with two forms of glass resulted in four types of erosion-rate-versus-time curves: (1) incubation, acceleration, and steady-state periods (type I), (2) incubation, acceleration, deceleration, and steady-state periods (type III), (3) incubation, acceleration, peak rate, and deceleration periods (type IV), and (4) incubation, acceleration, steady-state, and deceleration periods (type V). B.W.

N83-24638*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE EFFECTS OF Ni, Mo, Ti AND Si ON THE MECHANICAL PROPERTIES OF Cr FREE Mn STEEL (Fe-25Mn-5Al-2C)
Susan R. Schuon 1982 18 p refs Presented at Fall Meeting of the Met. Soc., St. Louis, 24-28 Oct. 1982; sponsored by American Institute of Mining, Metallurgical and Petroleum Engineers
(NASA-TM-83355; E-1612; NAS 1.15:83355) Avail: NTIS HC A02/MF A01 CSCL 11F

The FeMnAlC alloys may hold potential as Cr-free replacements for high strategic material iron base superalloys, but little is known about their intermediate temperature (650 C to 870 C) mechanical properties. The effects of alloying elements on the mechanical properties of model FeMnAlC alloys were studied. Results showed that modified FeMnAlC alloys had promising short term, intermediate temperature properties but had relatively poor stress rupture lives at 172 MPa and 788 C. Room temperature and 788 C tensile strength of FeMnAlC alloys were better than common cast stainless steels. Changes in room temperature tensile and 788 C tensile strength and ductility, and 788 C stress rupture life were correlated with changes in Ni, Mo, Ti, and Si levels due to alloying effects on interstitial carbon levels and carbide morphology. Fe-25Mn-5Al-2C had a very poor stress rupture life at 172 MPa and 788 C. Addition of carbide-forming elements improved the stress rupture life. Author

N83-24639*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPROVED NICKEL BASE COATING ALLOY Patent Application
Charles A. Barrett and Carl E. Lowell, inventors (to NASA) Filed 23 Mar. 1983 7 p
(NASA-Case-LEW-13834-1; US-Patent-Appl-SN-478131) Avail: NTIS HC A02/MF A01 CSCL 11F

Zirconium is added to a Ni-30 Al (beta) intermetallic alloy in the range of 0.05 w/o to 0.25 w/o. This addition is made during melting or by using metal powders. The addition of zirconium improves the cyclic oxidation resistance of the alloys at temperatures above 1100 C. NASA

N83-24640*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NITRIDING OF TITANIUM AND TITANIUM: 8 PERCENT ALUMINUM, 1 PERCENT MOLYBDENUM, 1 PERCENT VANADIUM ALLOY WITH AN ION-BEAM SOURCE
Alfred Gill (Ben Gurion Univ. of the Negev) Apr. 1983 11 p refs
(NASA-TP-2149; E-1227; NAS 1.60:2149) Avail: NTIS HC A02/MF A01 CSCL 11F

Titanium and Ti-8Al-1Mo-1V alloy were nitrided with an ion-beam source of nitrogen or argon and nitrogen at a total pressure of 2 x 10 to the minus 4th power to 10 x 10 to the minus 4th power torr. The treated surface was characterized by surface profilometry, X-ray diffractometry, Auger electron spectroscopy and microhardness measurements. The tetragonal Ti2N phase formed in pure titanium and Ti-8Al-1Mo-1V alloy with traces of AlN in the alloy. Two opposite processes competed during the ion-beam-nitriding process: (1) formation of nitrides in the surface layer and (2) sputtering of the nitrided layers by the ion beam. The highest surface hardnesses, about 500 kg/sq mm in titanium and 800 kg/sq mm in Ti-8Al-1Mo-1V, were obtained by ion nitriding with an ion beam of pure nitrogen at 4.2 x 10 to the minus 4th power torr at a beam voltage of 1000 V. Author

N83-24641*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MORPHOLOGY OF AN ALUMINUM ALLOY ERODED BY A JET OF ANGULAR PARTICLES IMPINGING AT NORMAL INCIDENCE
P. Veerabhadra Rao, Stanley G. Young (NASA. Kennedy Space Center), and Donald H. Buckley May 1983 15 p refs
(NASA-TP-2139; E-1166; NAS 1.60:2139) Avail: NTIS HC A02/MF A01 CSCL 11F

The erosion of an aluminum alloy impinged by crushed glass particles at normal incidence was studied. The erosion patterns were analyzed by scanning electron microscopy, energy dispersive X-ray spectroscopy, and surface profilometer measurements. From the analysis of specimens tested at various driving gas pressures and time intervals, four distinct erosion regions were identified. A study of pit morphology and its relationship to cumulative erosion was made. Cutting wear is believed to be the predominant material removal mechanism; some evidence of deformation wear was found during the incubation period. Author

N83-24642# National Materials Advisory Board, Washington, D.C.
EFFECTIVE USE OF WELD METAL YIELD STRENGTH FOR HY-STEELS Final Report
Jan. 1983 159 p refs
(Contract MDA903-82-C-0434)
(AD-A124234; NMAB-380) Avail: NTIS HC A08/MF A01 CSCL 11/6

This report reviews the presently available welding technology for high-yield-strength steel (HY-steel) systems from the viewpoint of suggesting where fabrication cost savings might be achieved without sacrificing weldment integrity or performance. The review involves: economic analysis of fabrication costs; present criteria for high strength steel weldment performance, both military and industrial; present understanding of the effects of hydrogen in high strength steel weldments; factors affecting weld metal mechanical properties; and factors affecting weldment mechanical performance. GRA

N83-24643# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
NUCLEATION THRESHOLD STRESSES FOR THE DYNAMIC FRACTURE OF A LOW-ALLOY Ni-Cr STEEL Final Report
Gerald L. Moss, Paul H. Netherwood, Jr., and Lynn Seaman Jan. 1983 19 p refs
(DA Proj. 1L1-61102-AH-43)
(AD-A123696; ARBRL-TR-02460) Avail: NTIS HC A02/MF A01 CSCL 11/6

The stresses sigma(no) required for the nucleation of cracks with tensile stress waves were determined as a function of the strength of the steel. These threshold levels were established with the crack densities developed with parallel-plate impacts and the corresponding tensile stresses. The tensile stresses were determined with a procedure that accounts for the effects of elastic-plastic wave interactions and void development on the intensity of the tensile stresses. Two new results were discovered. First, it was established how sigma(no) depends on the yield

strength of the material and, second, an equation was developed that describes how the crack nucleation rate changes with stress. This relation applies for the entire range of stresses extending from the stress at which cracking begins to at least two and a half times this value. GRA

N83-24644# Imperial Coll. of Science and Technology, London (England).
THE ROLE OF HYDROGEN IN THE STRESS CORROSION FAILURE OF HIGH STRENGTH Al-Zn-Mg ALLOYS Annual Report, Sep. 1980 - Oct. 1982
M. L. Yuen and H. M. Flower Oct. 1982 29 p refs
(Contract DAJA37-80-C-0372; DA Proj. 1T1-61102-BH-57)
(AD-A123693) Avail: NTIS HC A03/MF A01 CSCL 11/6

Three alloys, Al 6% Zn 3% Mg. Al 6% Zn 3% Mg 1.7% Cu and Al 6% Zn 3% Mg 0.14% Cr. were pre-exposed in the solution treated condition to water vapour at 115C. Dry control tests were also performed. Both sets of samples were tested in tension using a slow strain rate of 1/1,000,000S and the results were compared with previously obtained data using a strain rate of 1/1000S. All the samples exposed to steam showed evidence of hydrogen embrittlement, the effects being more severe at the slow strain rate. Evidence was also obtained for hydrogen embrittlement via reaction of the metal with the laboratory air during slow strain rate testing in all cases except for the copper containing alloy. Both intergranular and transgranular brittle fracture can be produced as a result of hydrogen absorption into the metal: tolerance to hydrogen is related to the ability of the microstructure to trap hydrogen in the form of gas bubbles. GRA

N83-24645# Northwestern Univ., Evanston, Ill. Dept. of Materials Science and Engineering.
SYNTHESIS AND PROPERTIES OF ELEVATED TEMPERATURE P/M ALUMINUM ALLOYS Annual Technical Report, 1 Oct. 1981 - 30 Sep. 1982
Morris E. Fine and Julia R. Weertman 29 Nov. 1982 34 p refs (Grant AF-AFOSR-0005-82; AF Proj. 2306)
(AD-A123224; AFOSR-82-1062TR) Avail: NTIS HC A03/MF A01 CSCL 11/6

In dispersion strengthened high temperature alloys the particle radius is theoretically predicted to be proportional to Sigma DC sub 0 1/3 where sigma is the interfacial energy, D, the diffusivity, C sub 0 the solubility limit and t is time. Thus, information about sigma, D, and C sub 0 are needed to design and evaluate high temperature alloys. The A1-8Fe-3Ce alloy developed by Alcoa Research center is being studied on this basis. Assuming diffusion of iron is rate controlling, values of sigma are calculated indicating an incoherent interface; however, the coarsening is more complex than predicted by the simple theory. Low values of sigma are expected when there is good lattice matching across the interface. A13(Ti,Zr,Hf) is being studied seeking good lattice matching. A13,(Ti,Zr), A13(Ti,Hf), A13(Zr,Hf) were studied to date and the best matching is obtained with A13(Ti0.75 Zr0.25) where the lattice mismatch between the compound and aluminum is 3-4%. Author (GRA)

N83-24646# McDonnell-Douglas Research Labs., St. Louis, Mo. Solid State Sciences Dept.
MICROSTRUCTURE AND PROPERTIES OF POWDER-PROCESSED ALUMINUM-LITHIUM ALLOYS Final Report, 1 Apr. 1979 - 31 May 1982
S. M. L. Sastry, P. J. Meschter, J. E. O'Neal, and K. K. Sankaran 21 May 1982 77 p refs
(Contract F49620-79-C-0039; AF Proj. 2306)
(AD-A123166; AFOSR-82-1059TR; MDC-Q0778) Avail: NTIS HC A05/MF A01 CSCL 11/6

The overall objectives of this research program were to determine the source of brittleness in Al-Li alloys, determine ductility enhancement through slip homogenization effected by grain refinement and incoherent dispersoids, compare the properties of Al-Li alloys prepared from different types of rapidly solidified powders with the properties of cast Al-Li alloys and other commercial high-strength Al alloys, and identify and recommend for further development promising Al-Li alloy compositions for use in aircraft structures. The approach followed was that of rapid solidification and powder-processing, which result in significant microstructural refinement and make possible the processing of novel Al-Li alloy compositions not amenable to ingot-casting methods. GRA

N83-24647# Southwest Research Inst., San Antonio, Tex.
CRACK TIP PLASTICITY ASSOCIATED WITH CORROSION ASSISTED FATIGUE Final Report, Jun. 1974 - Dec. 1982
D. L. Davidson and J. Lankford 31 Dec. 1982 49 p refs
(Contract N00014-75-C-1038)
(AD-A123391) Avail: NTIS HC A03/MF A01 CSCL 11/6

Measurement of the influence of water vapor in the environment on fatigue crack tip strains and stresses has been the objective of this program. In low-carbon steel, stresses in the plastic zone were deduced by imaging subcells formed during fatigue crack growth. Water vapor was found to lower the stress levels and decrease the size of the zone of stresses exceeding the yield value. Strains within the plastic zone and at the crack tip may be determined by the stereoimaging technique. For low-carbon steel, water vapor lowers the strains carried by the crack tip, and stresses computed from these strains agree well with those determined from measurement of subcell size. A manuscript is included in this report which describes the computational technique of converting strains to stresses. GRA

N83-24648# Oak Ridge National Lab., Tenn.
ALLOY DEVELOPMENT FOR IRRADIATION PERFORMANCE Semiannual Progress Report, period ending 30 Sep. 1982
Feb. 1983 345 p refs
(Contract W-7405-eng-26)
(DE83-006357; DOE/ER-0045/9) Avail: NTIS HC A15/MF A01

Analysis and evaluation, test methods development, status of irradiation experiments, and corrosion testing and hydrogen permeation studies are reviewed. The ongoing work on each alloy development path is presented. For individual titles, see N83-24649 through N83-24674.

N83-24649# Argonne National Lab., Ill.
NEUTRON SOURCE CHARACTERIZATION FOR MATERIALS EXPERIMENTS
L. R. Greenwood *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 6-16 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Measurements and calculations are presented for the ORR-MFE4A spectral-tailoring experiment after an irradiation of 406 full power days (30 MW) between June 12, 1980 and April 26, 1982. The maximum fluence inside the capsule was 1.76 x 10(22) n/cm(2) producing 4.67 DPA and 63 appm He in stainless steel (13%) Ni. Values outside the sample holders were 1.88 x 10 (22) n/cm(2), 4.94 DPA and 73 appm He in stainless steel. Helium calculations include epithermal effects and the extra displacements from the energetic (56)Fe recoils. DOE

N83-24650# Oak Ridge National Lab., Tenn.
OPERATION OF THE ORR SPECTRAL TAILORING EXPERIMENTS ORR-MFE-4A AND ORR-MFE-4B
J. A. Conlin, I. T. Dudley, and E. M. Lees *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 17-20 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The ORR-MFE-4A experiment operated for an equivalent of 413 d at 30 MW reactor power, with specimen temperatures of 400 and 330 C. It was removed from the reactor because a leak developed in the primary containment. The specimens were transferred to a new capsule, and that assembly has been reinstalled in the ORR for continued irradiation. The ORR-MFE-4B experiment, with specimen temperatures of 500 and 600 C, operated for 406 d at 30 MW reactor power. Author

N83-24651# Westinghouse Hanford Co., Richland, Wash.
HFIR/FFTF IRRADIATION EXPERIMENT, FINAL DESIGN PHASE
A. M. Ermi, D. L. Greenslade, and J. M. Vitek (ORNL) *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 21-31 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The combined HFIR/FFTF experiment on the Path A Primer Candidate Alloy and the Path D Long-Range Ordered Alloys is in the final design stage. A sodium-filled test assembly to be used for the HFIR irradiation has been designed, the main features of which are described. The updated proposed test matrix is also presented. DOE

N83-24652# Oak Ridge National Lab., Tenn.
NEUTRONICS CALCULATIONS IN SUPPORT OF THE ORR-MFE-4 SPECTRAL TAILORING EXPERIMENTS
R. A. Lillie, T. A. Gabriel, and R. L. Childs *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 32-35 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The neutronic design for materials irradiation experiments in the Oak Ridge Research Reactor (ORR) is discussed. Spectral tailoring to control the fast and thermal fluxes is required to provide the desired displacement and helium production rates in alloys containing nickel. Author

N83-24653# Oak Ridge National Lab., Tenn.
IRRADIATION CREEP IN PATH A ALLOYS IRRADIATED TO 5 DPA IN THE ORR-MFE-4A SPECTRAL TAILORING EXPERIMENT
M. L. Grossbeck *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 38-43 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Pressurized tubes have been irradiated to 4.8 dpa at 330 and 4000C in the ORR-MFE-4A spectral tailoring experiment. At 3300C, 20%-cold-worked type 316 stainless steel (CW 316) and path A PCA demonstrated irradiation creep similar to predictions of the irradiation creep equation developed in the Fast Breeder Reactor Program. The creep rate for path A PCA was approximately 25% higher than that of type 316 stainless steel. DOE

N83-24654# Oak Ridge National Lab., Tenn.
SWELLING AND MICROSTRUCTURAL DEVELOPMENT IN PATH A PCA AND TYPE 316 STAINLESS STEEL IRRADIATED IN HFIR TO ABOUT 22 DPA
P. J. Maziasz and D. N. Braski *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 44-62 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Irradiation of several microstructural variants of PCA and 20%-cold-worked N-lot type 316 stainless steel (CW 316) in HFIR to about 10 dpa produced no visible cavities at 300 C, bubbles at 400 C, and varying distributions of bubbles and voids at 500 and 600 C. The PCA-B1 swells the most and CW 316 (N-lot) the least at 600 C. Irradiations have been extended to about 22 dpa. The PCA-Al swells 0.06%/dpa at 600 C but at a much lower rate at 500 C. The PCA-A3 shows the lowest swelling at 600 C, about half the swelling rate of type 316 stainless steel. Author

N83-24655# Oak Ridge National Lab., Tenn.
THE TENSILE PROPERTIES OF UNIRRADIATED PATH A PCA
D. N. Braski and P. J. Maziasz *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 63-70 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The tensile properties of PCA in the Al (solution annealed), A3 (25%-cold worked), and B2 (aged, cold worked, and reaged) conditions were determined from room temperature to 600 C. The tensile behavior of PCA-Al and -A3 was generally similar to that of titanium-modified type 316 stainless steel with similar microstructures. The PCA-B2 was weaker than PCA-A3, especially above 500 C, but demonstrated slightly better ductility. Author

N83-24656# Oak Ridge National Lab., Tenn.
TENSILE PROPERTIES AND SWELLING OF 20 PERCENT-COLD-WORKED TYPE 316 STAINLESS STEEL IRRADIATED IN HFIR
R. L. Klueh and M. L. Grossbeck *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 71-77 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Immersion density and elevated-temperature tensile properties were determined on 20%-cold-worked type 316 stainless steel irradiated in the HFIR to fluences of 3.5 to 6.3 x 10(26) neutrons/m(2), which resulted in 25 to 49 dpa and 1650 to 3100 at. ppM He. These data were combined with the data previously obtained after irradiation to lower fluences (< 4.0 x 10(26) neutrons/m(2)). DOE

N83-24657# Oak Ridge National Lab., Tenn.
MICROSTRUCTURAL DEVELOPMENT OF 20 PERCENT-COLD-WORKED TYPE 316 STAINLESS STEEL IRRADIATED IN ORR AT 250 TO 500 DEG C
P. J. Maziasz *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 78-88 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

No voids, bubbles, or precipitation are observed in 20%-cold-worked (ref.-heat) type 316 stainless steel irradiated in ORR at 250 to 5000C to produce 5 dpa and 38.7 at. ppM He. There is some recovery of the cold-worked structure at 5000C, but not at 250 to 4500C. The total dislocation structure is quite dense from 250 to 4500C due to the presence of many Frank loops and a high concentration of fine loops (black dots). No significant effect of helium could be determined, but bubble formation appears retarded in ORR compared with that in HFIR. DOE

N83-24658# Westinghouse Hanford Co., Richland, Wash.
THE DUCTILITY BEHAVIOR OF IRRADIATED PATH ALLOYS
W. J. S. Yang and M. L. Hamilton *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 90-120 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The practicality of using five Path B alloys in their current form as structural materials in the Fusion First-Wall/Blanket by evaluating both their postirradiation ductility and the corresponding microstructures was assessed. DOE

N83-24659# Westinghouse Hanford Co., Richland, Wash.
MECHANICAL PROPERTY EVALUATIONS OF PATH C VANADIUM SCOPING ALLOYS
R. E. Gold and R. Bajaj *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 122-142 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Creep/stress-rupture tests were performed on sheet specimens of the three Path C vanadium Scoping Alloys in the temperature range 650 to 8000C. These specimens were intentionally contaminated with nominal additions of 600 and 1200 wppm oxygen by controlled gas-metal reactions. The effects of oxygen additions on the creep behavior of the vanadium alloys, over the limited range of stress-temperature conditions examined, did not appear to be significant. Creep strengths and ductilities appeared to be affected very little compared to tests at similar conditions on noncontaminated specimens of the vanadium alloys. These results are different in that regard from similar comparisons of tensile properties of contaminated and noncontaminated vanadium alloy specimens where a partial change in the fracture behavior was observed for the oxgyen-contaminated specimens. DOE

N83-24660# Oak Ridge National Lab., Tenn.
MICROSTRUCTURE OF WELDS IN AN IRON-BASE LONG-RANGE-ORDERED ALLOY

D. N. Braski and S. A. David *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 144-157 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The microstructure of gas tungsten arc (GTA) welds of a (Ni, Fe)3(V,Ti) long-range-ordered (LRO) alloy was investigated. Crack-free welds were produced in which the heat-affected zone (HAZ) and fusion zone were disordered and softened. A postweld heat treatment increased the hardness of both zones by reordering the structure and produced additional hardening in the fusion zone due to precipitation of small VC particles on grain boundaries and matrix dislocations. DOE

N83-24661# Oak Ridge National Lab., Tenn.
STATUS OF SCALE-UP OF AN IRON-BASE LONG-RANGE-ORDERED ALLOY
T. K. Roche, D. N. Braski, and C. T. Liu *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 158-159 ref (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Semiproduction scale-up of an iron base long range ordered (LRO) alloy was performed in order to gain commercial experience with this class of development alloy. The activity will provide material for irradiation, mechanical property, compatibility, and other property tests to evaluate the potential of the alloy class for use in fusion energy systems. Author

N83-24662# Westinghouse Hanford Co., Richland, Wash.
MICROSTRUCTURAL EXAMINATION OF HT-9 IRRADIATED IN THE HFIR-CTR-32 EXPERIMENT
D. S. Gelles and L. E. Thomas *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 162-177 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Applicability of martensitic stainless steels for reactor structural components is provided. Specimens of HT-9 (heat 91354) were examined by analytical electron microscopy following irradiation in HFIR. Dislocation loops and G phase particles but no voids formed during irradiation. Comparisons with microstructures of HT-9 specimens irradiated in ERB-II allow the conclusion that a twenty fold increase in helium production has no significant effect on microstructural development in HT-9 for irradiation at 400 C to doses on the order of 10 dpa. Author

N83-24663# Oak Ridge National Lab., Tenn.
FRACTOGRAPHIC EXAMINATION OF HT-9 AND 9Cr-1Mo CHARPY SPECIMENS IRRADIATED IN THE AD-2 TEST
D. S. Gelles and W. L. Hu *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 178-219 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Fracture surface topologies were examined using scanning electron microscopy for 20 selected half sized Charpy impact specimens of HT-9 and Modified 9Cr-1Mo in order to provide improved understanding of fracture toughness degradation as a result of irradiation for Path E alloys. The specimen matrix included unirradiated specimens and specimens irradiated in FBR-II in the AD-2 experiment. Also, hardness measurements were made on selected irradiated Charpy specimens. The results of examinations indicate that irradiation hardening due to G-phase formation at 390 C is responsible for the large shift in ductile to brittle transition temperature (DBTT) found in HT-9. Toughness degradation in HT-9 observed following higher temperature irradiations is attributed to precipitation at delta ferrite stringers. Reductions in toughness as a consequence of irradiation in Modified 9Cr-1Mo are attributed to in-reactor precipitation of (V,Nb)C and M23C6. It is shown that crack propagation rates for ductile and brittle failure modes can be measured. DOE

N83-24664# Westinghouse Hanford Co., Richland, Wash.
FRACTURE TOUGHNESS OF UNIRRADIATED HT-9 AND MODIFIED 9Cr-1Mo WELDS
F. H. Huang *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 221-229 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The fracture toughness of HT-9 weld metal, HT-9 heat affected zone (HAZ) and modified 9Cr-1Mo weld metal was measured using electropotential techniques. Circular (2.54 mm thick) compact tension specimens were fabricated from welded materials with the notch orientation parallel to the fusion line. Tests were performed at 93, 205, 427 and 538 C. The test results were analyzing using the J-integral approach. It was found that the fracture toughness of HT-9 and modified 9Cr-1Mo was not significantly reduced due to welding. DOE

N83-24665# Sandia Labs., Livermore, Calif.
THE EFFECT OF MELT PRACTICE (ESR VS. AOD) ON THE TOUGHNESS OF HT-9 LASER WELDS
J. C. Lippold *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 231-243 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The toughness behavior of lase. welded AOD- and ESR-processed material from the National Fusion Heat was evaluated. In general, the fusion zone toughness was equivalent, if not superior, to that of the base metal. The microstructural refinement which results from weld solidification is probably responsible for the improvement in properties. The chemical inhomogeneity due to partitioning during solidification is probably responsible for the improvement in properties. The chemical inhomogeneity due to partitioning during solidification appears to exert only a small effect on the properties. The fracture mode is analogous to that of the base material; lower shelf failure exhibits a cleavage mode while upper shelf failure occurs by ductile rupture. DOE

N83-24666# Sandia Labs., Livermore, Calif.
THE EFFECT OF QUENCH RATE AND REFRIGERATION ON THE MECHANICAL PROPERTIES OF ESR PROCESSED HT-9
W. M. Garrison, Jr. and J. M. Hyzak *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 244-251 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Ht-9 contains about 9 volume percent retained austenite when air cooled after austenitizing. To reduce the retained austenite content of HT-9 from that of the air cooled (AC) condition, two other treatments after austenitizing were employed: oil quenching (OQ) and oil quenching followed by refrigeration in liquid nitrogen (OQIN). The OQ structure contained 6% retained austenite and the OQIN structure had only 4% retained austenite. Preliminary Charpy impact data indicate some beneficial effect of these treatments. The Charpy impact values of specimens tempered at 7500C were 78, 80 and 97 ft-lbs for the AC, OQ and OQIN structures respectively. DOE

N83-24667# Naval Research Lab., Washington, D. C.
PREPARATION OF ESR ALLOY HT-9 AND MODIFIED 9Cr-1Mo ALLOY FOR UBR IRRADIATION EXPERIMENTS
J. R. Hawthorne *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 252-254 ref (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Alloy HT-9 and Alloy 9Cr-1Mo (Mod.) were evaluated for potential application as first wall materials in magnetic fusion reactors. Material notch ductility and fracture toughness in the pre and postirradiation conditions were assessed and the miniature test specimens required for high flux reactor experiments were correlated with standard size specimens. Planning and preparations for two irradiation experiments involving Alloy HT-9 and Alloy 9Cr-Mo (Mod.) were completed. S.L.

N83-24668# Westinghouse Hanford Co., Richland, Wash.
MINIATURE CHARPY IMPACT TEST RESULTS FOR IRRADIATED FERRITIC ALLOYS
W. L. Hu *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 255-272 refs (For primary document see N83-24648

14-26)
Avail: NTIS HC A15/MF A01

Impact tests of irradiated Charpy specimens made of ferritic alloys were conducted at temperatures from -650 to 2500C. The specimens involve four different material stocks, namely, HT-9 base metal, HT-9 weld metal, HT-9 heat affected zone and modified 9Cr-1Mo base metal. The specimens were irradiated in EBR-II to a peak exposure of approximately 13 dpa at temperatures of 390, 450, 500 and 5500C. Specimens made of unirradiated HT-9 base metal and modified 9Cr-1Mo base metal were also tested. DOE

N83-24669# Oak Ridge National Lab., Tenn.
IRRADIATION EXPERIMENT STATUS AND SCHEDULE
M. L. Grossbeck *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 274-284 (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The parameters that describe experiments that were completed are summarized. Experiments that were removed from the reactor are undergoing irradiation, or are planned for irradiation. Experiments are now under way in mixed spectrum reactors, and in the Experimental Breeder Reactor (EBR-II), which is a fast reactor. During the reporting period experiments HFIR-CTR-34 and -35 were removed from the HFIR. These are the first elevated temperature HFIR experiments with Charpy specimens of ferritic alloys. Experiment HFIR-MFE-T1, containing ferritic alloys, also completed irradiation at 55 C. In addition, HRIR-MFE-BBI containing a wide variety of specimens of ferritic alloys, completed irradiation. Some of these specimens were reencapsulated and irradiated in HFIR-MFE-RB3. These elevated temperature experiments containing tensile specimens of ferritic alloys -- HFIR-CTR-39, 40, and 41 were loaded into the reactor. S.L.

N83-24670# Oak Ridge National Lab., Tenn.
FUSION PROGRAM RESEARCH MATERIALS INVENTORY
F. W. Wiffen, T. K. Roche, J. W. Davis (McDonnell Douglas Co.), and T. A. Lechtenberg (General Atomic Co.) *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 285-290 (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

A central inventory of research materials is maintained to provide a common supply of materials for the Fusion Reactor Materials Program. This minimizes unintended material variations and provides for economy in procurement and for centralized record keeping. Initially this inventory is to focus on materials related to first wall and structural applications and related research, but various special purpose materials may be added. The use of materials from this inventory for research that is coordinated with or otherwise related technically to the Fusion Reactor Materials Program is encouraged. S.L.

N83-24671# Oak Ridge National Lab., Tenn.
CORROSION OF PATH A PCA, TYPE 316 STAINLESS STEEL AND Fe-12 Cr-1 MoVW STEEL IN FLOWING LITHIUM
P. F. Tortorelli and J. H. DeVan *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 290-303 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Results from lithium thermal convection loop (TCL) experiments with the path A prime candidate alloy (PCA), type 316 stainless steel, and Fe-12 Cr-1 MoVW are presented. The short term (< 3050 h) weight losses of PCA in flowing lithium were just slightly higher than those of type 316 stainless steel and may be attributable to the higher nickel concentration of PCA. The corrosion response of PCA specimens was not affected by cold work. A surface analysis of type 316 stainless steel specimens exposed in the hot leg of a TCl for over 7000 h confirmed earlier observations regarding preferential leaching of nickel and chromium and deposition of pure chromium. These analyses also showed that exposure temperature strongly affects surface porosity and that molybdenum enrichment occurs on surface undergoing dissolution. Weight loss data as a function of time for Fe-12 Cr-1 MoVW steel exposed to lithium at 5000C yielded the same dissolution rate as the steady state value for nickel depleted type 316 stainless steel. Significant weight losses were measured in the cold leg of this loop, and they appeared to be related to chromium depletion (possibly as a result of impurity reactions). DOE

N83-24672# Argonne National Lab., Ill.
ENVIRONMENTAL EFFECTS ON PROPERTIES OF STRUCTURAL ALLOYS
O. K. Chopra and D. I. Smith *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 304-313 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Compatibility tests were conducted with several ferritic and austenitic steels at 700 and 755 K to study the corrosion behavior in flowing lithium, and fatigue tests were performed with Type 316 stainless steel in lithium at 755 K. The results indicate that an increase in the nitrogen content in lithium increases the dissolution rate, whereas the depth of internal penetration is not affected significantly. The dissolution rate of ferritic steels is an order of magnitude lower than for the austenitic stainless steel. The austenitic steels develop a very porous ferrite layer, whereas the ferritic steels exhibit little or no penetration. For the austenitic stainless steels, depth of internal penetration increases with time and the penetration rates at 755 K range from 50 to 180 (SIGMA)m/year. Preliminary data on Type 316 stainless steel yield similar penetration rates at 700 and 755 K. The fatigue life of annealed Type 316 stainless steel in lithium at 755 K is a factor of 3 to 8 greater than in air. DOE

N83-24673# Oak Ridge National Lab., Tenn.
CORROSION OF FERROUS ALLOYS IN STATIC Pb AND Pb-17 AT. % LI
P. F. Tortorelli and J. H. DeVan *In its* Alloy Develop. for Irradiation Performance Feb. 1983 p 314-322 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

Specimens of type 316 stainless steel were exposed to static pure lead for 1000 and 3000 h at 400, 500, and 6000C, respectively. Weight losses measured in these tests were compared with those measured in similar tests with Pb-17 at. % Li. The data showed that the addition of 17 at. % Li to lead has some effect on its dissolution behavior relative to type 316 stainless steel; however, the weight losses in both the lead-lithium and pure lead melts were much larger than in pure lithium. Preliminary results from compositional analyses of type 316 stailess steel exposed to static Pb-17 at. % Li showed surface depletion of nickel at 5000C. DOE

N83-24674# Argonne National Lab., Ill.
COMPATIBILITY STUDIES OF STRUCTURAL ALLOYS WITH SOLID BREEDER
O. K. Chopra and D. L. Smith *In* ORNL Alloy Develop. for Irradiation Performance Feb. 1983 p 323-338 refs (For primary document see N83-24648 14-26)
Avail: NTIS HC A15/MF A01

The compatibility of solid breeder materials with structural alloys are evaluated. The interactions between breeder materials and alloys are investigated as a function of temperature, time, and environmental parameters (i.e., flowing helium environments with different moisture contents). Reaction rates are determined by measuring the weight change, depth of internal penetration, and thickness of corrosion scales. These measurements, coupled with metallographic evaluation of the alloy surfaces, are used to establish the mechanisms and rate controlling processes for the corrosion reactions. Breeder materials to be investigated include Li2O, LiAlO2, Li2SiO3, Li2TiO3, and Li2ZrO3. S.L.

N83-24675# United Technologies Corp., South Windsor, Conn. Power Systems Div.
PARAMETER MONITORING FOR CORROSION CONTROL OF UTILITY GAS TURBINES Final Report
M. Krasij, B. M. Barnum, and F. S. Kemp Dec. 1982 117 p refs (EPRI Proj. 643-1)

(DE83-900991; EPRI-AP-2737) Avail: NTIS HC A06/MF A01

Hot corrosion of turbine airfoil materials which is one of the main factors limiting the durability in industrial gas turbine engines was examined. It is caused primarily by the reaction of deposited alkali sulfate with the turbine airfoil materials. It was confirmed that: (1) a corrosion control system operating in a field environment would reliably measure the accumulation of corrodents ingested in an engine; and (2) removal of accumulated corrodents would effectively inhibit hot corrosion. It is shown that the turbine vanes in the test engine, which was water washed when the corrosion control system determined that the total ingested sodium concentration exceeded a critical limit, had fewer deposits and were significantly less corroded than those installed in the control engine. It is shown that the corrosion control system is effective and performed satisfactorily in a field environment. DOE

N83-24676# Mound Lab., Miamisburg, Ohio.

DIRECT BONDING OF MOLYBDENUM AND NIOBIUM FEEDTHROUGHS IN ELECTRONIC GRADE ALUMINA

Michael Kelly 1982 29 p Presented at the 6th Ann. Conf. on Composites and Ceramic Mater., Cocoa Beach, Fla., 17 Jan. 1982

(Contract DE-AC04-76DP-00053)

(DE82-005668; MLM-2891-OP; CONF-820115-1) Avail: NTIS HC A03/MF A01

Molybdenum and niobium pins were investigated as potential electrical feedthroughs in alumina ceramic components. Ceramic powder was isostatically pressed around the metal pins prior to sintering. Reactions observed between molybdenum and niobium and the ceramic matrix will be discussed, along with design criteria for fabrication. DOE

N83-24677# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.

MICROMECHANICAL MODELING OF MICROSTRUCTURAL DAMAGE IN CREEPING ALLOYS Progress Report, 1 Apr. 1981 - 28 Feb. 1982

A. S. Argon, F. A. McClintock, I.-W. Chen, and S. E. Stanzl 1 Mar. 1982 34 p refs

(Contract DE-AS02-77ER-04461)

(DE82-009141; DOE/ER-04461/5) Avail: NTIS HC A03/MF A01

Progress is reported in studies of intergranular cavitation as well as of crack growth and macrofracture. Aspects discussed cover: (1) suppression of cavity formation; (2) creep crack growth under time-varying loads; (3) modeling creep car crack growth by constraint cavitation; and (4) modeling creep crack growth under steady loading in type 304 stainless steel. DOE

N83-24678# Pacific Northwest Lab., Richland, Wash.

KRYPTON-85 STORAGE IN SPUTTER-DEPOSITED AMORPHOUS METALS

G. L. Tingey, E. D. McClanahan, J. M. Lytle, N. R. Gordon, and R. W. Knoll Jun. 1982 18 p refs Presented at CEC Specialists Meeting Methods of Krypton-85 Management, Brussels, 29 Jun. 1982

(Contract DE-AC06-76RL-01830)

(DE82-019206; PNL-SA-10536; CONF-8206104-1) Avail: NTIS HC A02/MF A01

After comparing options for storing radioactive krypton gas, ion implantation of the gas into a sputter-deposited metal matrix as the reference process was selected. This technique is being developed with pilot scale testing and further characterization of the deposited product. The process involves implanting krypton atoms into a growing deposit during the sputtering process. An amorphous metal deposit of nominal composition Ni0 81La0 09Kr0 10 was selected for further studies because of the high krypton loading, high sputtering yield, relatively low cost of the metallic components, resistance to corrosion, and stability of the product. The krypton release from this amorphous metal is described as an activated diffusion process which increases linearly with the square root of time. Studies of krypton release rate as a function of temperature were completed and an activation energy for the diffusion of 70 kcal/mole obtained. DOE

N83-24679# Brookhaven National Lab., Upton, N. Y. Dept. of Nuclear Energy.

AMBIENT TEMPERATURE STRESS-CORROSION CRACKING OF SENSITIZED STAINLESS STEELS

Karl Sieradzki, Hugh S. Isaacs, and Roger C. Newman 1982 13 p refs Presented at the Natl. Assoc. of Corrosion Eng. Conf., Houston, Tex., 22 Mar. 1982

(Contract DE-AC02-76CH-00016)

(DE82-006846; BNL-30565; CONF-820314-1) Avail: NTIS HC A02/MF A01

The stress-corrosion cracking of sensitized Type 304 steel in low temperature borated water was observed. The probable role of low levels of chloride ions or sulfur-containing ions is described, including the relationship of the phenomenon to polythionic acid cracking. The mechanism of the sulfur-induced cracking and its usefulness as a test for sensitization are outlined. DOE

N83-24680# Brookhaven National Lab., Upton, N. Y.

ELECTROCHEMICAL ASPECTS OF STRESS-CORROSION CRACK GROWTH

R. C. Newman and K. Sieradzki Jun. 1982 30 p refs Presented at the 6th Canadian Fracture Conf. on Time Dependent Fracture of Eng. Mater.-Environ. Effects, Harrison Hot Springs, B. C., 17-18 Jun. 1982

(Contract DE-AC02-76CH-00016)

(DE82-021543; BNL-31776; CONF-8206115-1) Avail: NTIS HC A03/MF A01

Some contributions of electrochemical methods to the understanding of stress corrosion cracking are described, with examples drawn from studies of stainless steels, nickel alloys and brasses. Considerations related to the local alloy composition, solution composition and electrode potential within a crack are classified and illustrated. The relationship between electrochemical and acoustic noise is discussed. DOE

N83-24681# Oak Ridge National Lab., Tenn. REMAG.

APPLICATION OF QUANTITATIVE EELS TO ANALYSIS OF THE TITANIUM-CARBIDE PHASE IN AUSTENITIC STAINLESS STEELS

P. J. Maziasz and N. J. Zaluzec (Argonne Natl. Lab., Ill.) 1982 2 p refs Presented at the 10th Intern. Congr. on Electron Microscopy, Hamburg, 17 Aug. 1982

(Contract W-7405-eng-26)

(DE82-020931; CONF-820846-2) Avail: NTIS HC A02/MF A01

The light element (C,N,O) contents, particularly C, of individual particles of the titanium MC carbide phase. Analytical electron microscopy (AEM) studies can employ either electron energy loss spectroscopy (EELS) or X-ray energy dispersive spectroscopy (XEDS) with ultra-thin window detectors to detect these elements, but because MC contains substantial Mo and C, the former method is best. The alloy studied is, in wt%, a 14 Cr/16 Ni/0.25 Ti modification of normal Type 316 austenitic stainless steel and the microstructure studied was designed for scoping the resistance of this material to fusion irradiation. The key to this application is stability of the MC phase, and composition is very important to stability. The interfacing of EELS with the metallurgical system studied is emphasized. DOE

N83-24682# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

POWDER-METALLURGY-PROCESSED A15 Nb3AL SUPERCONDUCTING WIRES M.S. Thesis

J. Minghuang Hong Jun. 1982 112 p refs

(Contract DE-AC03-76SF-00098)

(DE82-022057; LBL-14749) Avail: NTIS HC A06/MF A01

The possibility of the manufacture of superconducting A15 Nb3Al wires by a powder metallurgy process was explored. A T/sub c/ value of 17 K and over J/sub c/ value of > 10,000 A/sq cm at 15 teslas and 4.2 K were obtained. The variations of both T/sub c/ and overall J/sub c/ with the temperature and time of the heat treatment employed were investigated. Based on those, a multiple step heat treatment was proposed and found to be beneficial to both T/sub c/ and overall J/sub c/. It is believed

that this resulted from the improvement of the superconducting characteristics within the wire. The variations of the overall J/sub c/ with other processing parameters were also investigated. Based on the results obtained, the importance of the filament thickness of Nb and Al and the NbAl interfacial area in determining the critical current density was discussed. Preliminary characterization of the microstructure of the reacted layer within the powder wire was performed using a transmission electron microscopy and the result was presented. DOE

N83-24683# Hanford Engineering Development Lab., Richland, Wash.
SWELLING BEHAVIOR OF 20% CW316 STAINLESS STEEL CLADDING IRRADIATED WITH AND WITHOUT ADJACENT FUEL
B. J. Makenas, J. F. Bates (Western Zirconium, Ogden, Utah), and J. W. Jost Jun. 1982 23 p refs Presented at the 11th Intern. Symp. on Effects of Radiation on Mater., Am. Soc. for Testing and Mater., Scottsdale, Ariz, 28 Jun. 1982
(Contract DE-AC06-76FF-02170)
(DE82-020501; HEDL-SA-2554-FP; CONF-820628-17) Avail: NTIS HC A02/MF A01

Swelling behavior has been evaluated for irradiated 20% CW 316 Stainless Steel used as cladding material for mixed-oxide fuel pins in EBR-II. This behavior has been compared statistically with the behavior of a large number of specimens which were irradiated without adjacent fuel in the same reactor. In spite of the chemical environment and stresses experienced by fueled cladding, the fueled and nonfueled cladding appear to behave in a similar manner although some divergence was noted for one of the cases studied. DOE

N83-24684# Bettis Atomic Power Lab., Pittsburgh, Pa.
RADIATION-INDUCED DIMENSIONAL CHANGES OF AM-350 STAINLESS STEEL (LWBR DEVELOPMENT PROGRAM)
B. C. Smith and B. Z. Hyatt Aug. 1982 72 p ref
(Contract DE-AC11-76PN-00014)
(DE82-021943; WAPD-TM-1406) Avail: NTIS HC A04/MF A01

AM-350 stainless steel, which is used for fuel rod support grids in the Light Water Breeder Reactor, experiences radiation-induced dimensional changes during in-reactor service. Dimensional changes (strain) were measured periodically for two sets of test specimens irradiated in a test reactor. The STRESME (curved beam) specimens showed a monotonic increase in strain with increasing fluence tending towards saturation of strain at a fast fluence approaching 140 x 10 to the 20th power n/sq. cm. (E > 1 MeV). The GROWME specimens (grid component growth specimens) showed increasing strains with increasing fluence to 27.5 x 10 to the 20th power n/sq cm. Strains of all samples were less than 0.12% at all fluences. Empirical correlations of the test data are presented. The results from the STRESME and GROWME tests showed good agreement. DOE

N83-24685# California Univ., Livermore. Lawrence Livermore Lab.
MECHANICAL PROPERTIES EVALUATION OF SOME COMMERCIAL BERYLLIUM MATERIALS
Alfred Goldberg, James E. Hanafee, and Robert G. Scott 30 Jun. 1982 59 p refs Presented at the JOWOG-22, Golden, Colo., 19-20 Apr. 1982
(Contract W-7405-eng-48)
(DE82-020851; UCRL-87392; CONF-820459-3) Avail: NTIS HC A04/MF A01

The integrity of a beryllium component that had developed questionable etching patterns on chemical milling is evaluated. The tensile properties of the beryllium material, which was vacuum hot pressed (VHP), and the same material after an additional hot isostatic pressing (VHP/HIP) were compared to the properties obtained on two acceptable beryllium materials. Tensile testing was performed under strain rate control conditions at approximately .00001 and .002/s at -22, 22, and 55 C. The tensile properties of the four materials fell within specifications and no obvious differences in their ductilities were observed. However, differences in strength values were obtained. In addition, yield drops were observed for the reference materials, while the VHP and VHP/HIP materials showed only a small inflection in strain hardening following initial yielding. Both the yield drop and inflection in strain hardening became more pronounced with an increase in temperature. DOE

N83-24686# Mound Lab., Miamisburg, Ohio.
ALUMINUM SURFACE-FILM GROWTH IN AlFe3O4 THERMITES DURING ACCELERATED AGING
Pu Sen Wang and Lowell D. Haws 10 Aug. 1982 12 p refs
(Contract DE-AC04-76DP-00053)
(DE82-021903; MLM-2971) Avail: NTIS HC A02/MF A01

The aluminum and iron oxide surfaces of Al/Fe3O4 thermite in powder and pressed pellet form were studied before and after accelerated aging at 180 deg C by X-ray photoelectron spectroscopy (XPS). The Al2O3 surface film thicknesses on Al metal were deduced from the intensity ratio of Al KLL Auger signals induced by X-ray radiation on Al2O3 and Al metal. Based on the mean free path of 16.5A for Al KLL Auger electrons, the oxide thickness on aluminum flake before mixing with Fe3O4 was estimated to be 8 to 9 A. A slight oxidation was observed on the aluminum surface after mixing with Fe3O4 at room temperature. Hot pressing this mixture at 425 deg C for 7 min increased the oxide film to 31 A. This surface oxide film seemed to protect the Al metal and further aging at 180 deg C produced no significant oxide growth. A layer of carboxylate was detected on the aluminum surface from the C 1s XPS signal. DOE

N83-24687# Telic Corp., Santa Monica, Calif.
INVESTIGATION OF CONTINUOUS DEPOSITION OF AMA-TYPE COATINGS ONTO STRIP AND SHEET BY SPUTTERING Final Report, 5 Sep. 1980 - 31 May 1982
John A. Thornton and James L. Lamb 15 Dec. 1982 86 p refs
(Contract DE-AC04-80AL-13116)
(DE83-005692; TELIC-82-3) Avail: NTIS HC A05/MF A01

The continuous deposition of Al2O3-Mo-Al2O3 coatings onto copper and aluminum foil strip was investigated. High rate Al2O3 reactive sputtering experiments are described. The continuous deposition of AMA coatings at reasonable production volumes requires Al2O3 deposition rates which can only be achieved with reactive sputtering targets operating in the non-oxidized or non-poisoned mode. The Al2O3 reactive sputtering from non-poisoned targets, with deposition rates approaching the range required for continuous deposition onto strip (2.5 to 3.3 nm/s), was demonstrated. Particular attention was given to the problems of gas phase isolation between adjacent processing stations. The continuous deposition studies were conducted with the Al2O3 reactive sputtering sources operating in the poisoned state. Short sections of strip were successfully coated. Problems of substrate heating precluded sustained operation in the continuous deposition mode. DOE

N83-24688# Brookhaven National Lab., Upton, N. Y. Corrosion Science Group.
ELECTROCHEMICAL ASPECTS OF STRESS-CORROSION CRACKING OF SENSITIZED STAINLESS STEELS
R. C. Newman, K. Sieradzki, and H. S. Isaacs 1982 29 p refs
(Contract DE-AC02-76CH-00016)
(DE82-020003; BNL-31648) Avail: NTIS HC A03/MF A01

The intergranular stress-corrosion cracking (SCC) of sensitized Type 304 stainless steel was studied using sodium thiosulphate solutions at room temperature. Electrochemical aspects of the cracking were examined using a potentiostatic scratching electrode technique applied to simulated grain boundary alloys. These results are compared with the current transients observed after intergranular fracture of embrittled specimens under the electrolyte. Dissolution kinetics within actual propagating cracks were explored using load modulation. Rapid intergranular failure in a thiosulphate solution can be induced by successive load pulses of extremely short duration. Difficulties in accounting for the SCC velocities by an electrochemical mechanism are discussed. DOE

N83-24689# Sandia Labs., Livermore, Calif. Materials Development Div.
CENTERLINE CRACKING IN ELECTRON-BEAM CAP-TO-HEADER WELDS IN TYPE 304L STAINLESS STEEL
J. C. Lippold Aug. 1982 35 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020858; SAND-82-8224) Avail: NTIS HC A03/MF A01

Two sets of cap-to-header EB welds in Type 304L exhibited a significant difference in hot cracking susceptibility which could be associated with the heat-to-heat variations in chemical composition and the resultant change in solidification behavior of the fusion zone. In one case, solidification of the entire fusion zone occurred with delta ferrite as the primary phase of solidification and resulted in crack-free weldments. In the other case, a localized shift from solidification as delta ferrite to solidification as austenite along the weld centerline was accompanied by hot cracking in the austenitic region. Segregation of nitrogen, a powerful austenite former, to the weld centerline promoted the transition to solidification as austenite. Microprobe and Auger surface analyses of the crack-susceptible microstructures revealed that enhanced sulfur segregation accompanied the shift in solidification behavior and was integral in the mechanism of crack formation. DOE

N83-24690# Bhabha Atomic Research Centre, Bombay (India). Radiometallurgy Div.
IRRADIATION-INDUCED EMBRITTLEMENT OF STEELS USED AS REACTOR-PRESSURE-VESSEL AND END SHIELDS
S. Chatterjee and K. S. Sivaramakrishnan 1981 46 p refs
(DE82-904603; BARC-1135) Avail: NTIS HC A03/MF A01

A review of the various factors that influence the irradiation induced changes in mechanical properties of reactor pressure vessel and end shield steel materials were brought out followed by some typical results on 3 wt% nickel steels and A 302B type of pressure vessel steels. These are the type of steels used in our operating reactors. The irradiation induced mechanical property changes were analyzed from reported results on nil ductility transition temperature changes (NDTT) from impact tests. The importance of carrying out in reactor surveillance program was also stressed. DOE

N83-24691# Connecticut Univ., Storrs. Inst. of Materials Science.
INVESTIGATION OF ROLE OF SUBSURFACE ZONES IN WEAR OF MATERIALS Progress Report, 1 Jun. 1982 - 31 May 1983
S. L. Rice, H. Nowotny, and R. Solecki Dec. 1982 29 p
(Contract DE-AC02-81ER-10910)
(DE83-900849; DOE/ER-10910/02) Avail: NTIS HC A03/MF A01

Material pairs were tested in the two possible configurations to study the effects of repetitive load cycling under differing thermal conditions. Results are presented for commercially pure metallic pairs Al-Mg, Al-Ti and Mg-Ti, including EDAX data which document characteristic Zone 3 formation in both specimen (pin) and counterface (disc) materials. Results are presented in which the tool steel CPM-10V is repetitively impacted against a 17-4 PH steel counterface, with one body wear observed. Duplex steels were investigated for their impact wear resistance, and microstructural morophology is of less significance than is the volume fraction of martensite. Results from a newly developed ring-on-ring wear apparatus and from temperature measurements on surfaces contacting under various loading conditions, by optical and thermocouple techniques are reported. Finite element analysis methodology, including description of a common mesh network suitable for both deformation and thermal studies, applied to the ring-on-ring geometry is also reported. Heat conduction from the zone of frictional contact is modeled with temperature dependent conductivity and asperity contact. DOE

N83-24692# Du Pont de Nemours (E. I.) and Co., Aiken, S.C.
ISOTOPE-DILUTION ANALYSES OF THE METALLIC ELEMENTS
Philippe Chastagner 1982 31 p refs
(Contract DE-AC09-76SR-00001)
(DE83-004924; DP-MS-82-76) Avail: NTIS HC A03/MF A01

The isotope-dilution mass spectroscopy (IDMS) technique has proven to be a reliable, versatile analytical tool. Its applications seem to be limited only by the ingenuity of the investigator. Among its advantages are: small sample size; general applicability; precision and accuracy; dynamic range; simplified chemistry; determination is fixed at the time and place of isotopic homogenization. The last listed item is especially important for nuclear safeguards and processes where inventories are critical. IDMS is now a routine analytical technique in geochemical and nuclear laboratories, and in many environmental laboratories. Microgram and nanogram samples are normally used, frequently with automatic mass spectrometers, in many of these routine applications. More advanced techniques permit picogram and sub picogram samples to be analyzed, and spike to sample ratios can range from 1:1 to 1:10(12) with detection limits at attogram levels for some elements. DOE

N83-24693# Sandia Labs., Albuquerque, N. Mex.
CHARACTERIZATION OF A PROCEDURE FOR PREPARING 6061 ALUMINUM ALLOY FOR BARRIER ANODIZATION
J. K. G. Panitz and D. J. Sharp Oct. 1982 40 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005383; SAND-82-1524) Avail: NTIS HC A03/MF A01

Samples of 6061-T6 alloy which are processed in baths simulating the effects of usage and etchant environment interactions were analyzed using Auger electron spectroscopy and electron microprobe analysis. Other samples which were prepared similarly were barrier anodized. The anodization voltage rise time to 950 V was used as a figure of merit for evaluating the practical effects of variations in the preparation chemistry sequence. It is observed that certain variations make a significant difference in the anodization characteristics. Alloy samples which are only solvent cleaned typically take 113% more times to reach 950 V than samples which are solvent cleaned and chemically etched. Samples which are etched in 5% NaOH and 50% HNO3 take 41% more time to reach 950 V compared to samples etched in all three etchants. DOE

N83-25064# Battelle Columbus Labs., Ohio. Physical Metallurgy Section.
HYDROGEN COMPATIBILITY OF STEELS
J. H. Holbrook, H. J. Cialone, and M. E. Mayfield *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 60-62 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-24694*# Dayton Univ., Ohio.
INTUMESCENT COATING DEVELOPMENT Final Report, 18 Jul. 1981 - 17 Jul. 1982
Ival O. Sayler and Charles W. Griffen Mar. 1983 44 p refs
(Contract NAS8-34544)
(NASA-CR-170737; NAS 1.26:170737; UDR-TR-82-133) Avail: NTIS HC A03/MF A01 CSCL 11C

A program was completed at the University of Dayton Research Institute in which polyimide and phenolic intumescent coatings were evaluated as supplemental thermal insulation for the sprayed-on foam insulation on the aft bulkhead of the space shuttle external tank. The purpose of the intumescent coating was to provide additional thermal protection during lift-off in order to replace the ablative heat resistant layer with a lighter weight material for increased payload in the shuttle. Author

N83-24695*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SOLID SPHERICAL GLASS PARTICLE IMPINGEMENT STUDIES OF PLASTIC MATERIALS

P. Veerabhadra Rao (National Academy of Sciences - National Research Council, Washington, D.C.), Stanley G. Young, and Donald H. Buckley 1983 19 p refs

(NASA-TP-2161; E-1122; NAS 1.60:2161) Avail: NTIS HC A02/MF A01 CSCL 11I

Erosion experiments on polymethyl methacrylate (PMMA), polycarbonate, and polytetrafluoroethylene (PTFE) were conducted with spherical glass beads impacting at normal incidence. Optical and scanning electron microscopic studies and surface profile measurements were made on specimens at predetermined test intervals. During the initial stage of damage to PMMA and polycarbonate, material expands or builds up above the original surface. However, this buildup disappears as testing progresses. Little or no buildup was observed on PTFE. PTFE is observed to be the most resistant material to erosion and PMMA the least. At low impact pressures, material removal mechanisms are believed to be similar to those for metallic materials. However, at higher pressures, surface melting is indicated at the center of impact. Deformation and fatigue appear to play major roles in the material removal process with possible melting or softening. Author

N83-24696# Rensselaer Polytechnic Inst., Troy, N. Y.

LUBRICANT FOAMING AND AERATION STUDY Interim Technical Report, Sep. 1980 - Mar. 1982

Sydney Ross and Yaakov Suzin Wright-Patterson AFB, Ohio AFWAL Oct. 1982 56 p refs

(Contract F33615-80-C-2017; AF Proj. 3048)

(AD-A124184; AFWAL-TR-82-2090) Avail: NTIS HC A04/MF A01 CSCL 11/8

The investigation of the mechanisms associated with lubricant foaming and aeration was analyzed. Initial studies included basestock ester and ester-additive systems. Foaming of these systems was investigated with respect to various parameters including solubility, surface viscosity, surface tension, and electrical properties. Total additive concentration and synergistic effects of nonfoaming additives are important variables relative to foaming. Author

N83-24697# Dayton Univ., Ohio. Aerospace Mechanics Group.

VITREOUS ENAMEL DAMPING MATERIAL DEVELOPMENT Final Technical Report, Oct. 1979 - Jul. 1982

Binod Kumar and Michael L. Drake Wright-Patterson AFB, Ohio AFWAL Nov. 1982 110 p refs

(Contract F33615-79-C-5108; AF Proj. 2418)

(AD-A124290; AFWAL-TR-82-4162; UDR-TR-82-105) Avail: NTIS HC A06/MF A01 CSCL 11/3

This report describes the results of several experimental investigations pertaining to the effects of composition, viscosity, microstructure, and constraining layer on the damping properties of vitreous enamels. New vitreous enamels such as mixed alkali silicate, lead silicate, and two phase fluoride composition have been characterized. The mixed alkali and lead silicate compositions exhibits the characteristic, viscoelastic damping peak. The damping temperatures and the peak intensities are compositions dependent. The fluoride composition initially shows a typical vitreous enamel damping peak; however, after a heat treatment significant broadening of the damping peak is noted. It is believed that the broadening occurs due to a second phase which develops after the heat treatment. A relationship between the glass transition temperature and damping temperaure have been developed. It has been determined that the viscosity in the damping range corresponds to approximately 1,000,000-10,000,000 poise. GRA

N83-24698# Wear Sciences, Inc., Arnold, Md.

LUBRICATION WITH NATURALLY OCCURRING DOUBLE OXIDE FILMS Final Report

M. B. Petterson, S. J. Calabrese, and B. Stupp 10 Nov. 1982 60 p refs

(Contract N00014-82-C-0247; ARPA Order 4477)

(AD-A124248) Avail: NTIS HC A04/MF A01 CSCL 11/8

A study was conducted to evaluate the lubrication characteristics of double oxides which could occur naturally on high temperature bearing materials. Consideration was given to the double oxides of iron, nickel, cobalt, rhenium, osmium, molybdenum, tungsten, vanadium, chromium, copper, titanium, aluminum, boron, and niobium. A survey was conducted to obtain property data on such compounds and a number selected for evaluation. Primary consideration was given to the rhenates, molybdates, vanadates, borates, osmoniates, and chromates. Friction tests were run over the temperature range 26 to 650 C with single oxides, double oxides, and metal powders which would form such oxides. GRA

N83-24699# Texas Univ., Austin.

METHYL METHACYLATE POLYMER-CONCRETE FOR BOMB DAMAGE REPAIR Final Report, Jun. 1980 - Sep. 1981

David W. Fowler, Donald R. Paul, B. F. McCullough, and Alvin H. Meyer Tyndall AFB, Fla. AFESC Aug. 1982 215 p refs

(Contract F08635-79-C-0103; AF Proj. 2104)

(AD-A123346; AFESC/ESL-TR-82-04) Avail: NTIS HC A10/MF A01 CSCL 13/3

Materials characterization studies have described monomer formulation for a wide range of ambient temperature. Strengths have been determined as a function of time from casting, casting temperature, testing temperature, aggregate moisture levels, type and size of aggregate, and amount of coarse aggregate. Aggregate moisture (5 percent) was found to result in up to 80-percent loss in modulus of rupture, or 60 percent when steel fibers were used. Shear strength between polymer concrete and asphalt was found to decrease with increasing temperature. The strength was less than 15 psi at 100 degrees F. Author (GRA)

N83-24700# Northeastern Univ., Boston, Mass. Inst. of Chemical Analysis Applications and Forensic Science.

CHARACTERIZATION OF MECHANICAL, THERMAL AND WEAR PROPERTIES OF TITANIUM RICH METALLIC GLASSES Final Report, 20 Jun. 1978 - 15 Mar. 1982

B. C. Giessen 20 Dec. 1982 15 p

(Contract DAAG29-80-C-0147; Grant DAAG29-78-G-0137)

(AD-A123595; ARO-15098.4-MS) Avail: NTIS HC A02/MF A01 CSCL 11/2

The subject of this program was a comprehensive study of the preparation and the mechanical, thermal, structural and electrochemical properties of titanium based metallic glasses, with emphasis on their wear properties, as well as an extension of this work to some related transition metal based alloy glasses. This work required several innovations in equipment and experimental techniques as well as construction of specialized facilities, in particular: design of a melt spinner capable of processing reactive alloys, development of a method to measure the Young's modulus of very small samples, and construction of a wear test unit. Author (GRA)

N83-24701# General Dynamics Corp., Fort Worth, Tex.

INTEGRATED METHODOLOGY FOR ADHESIVE BONDED JOINT LIFE PREDICTIONS Final Technical Report, Jul. 1979 - Jul. 1982

John Romanko, K. M. Liechti, and W. G. Knauss AFWAL Wright-Patterson AFB, Ohio Nov. 1982 171 p refs

(Contract F33615-79-C-5088)

(AD-A124324; AFWAL-TR-82-4139) Avail: NTIS HC A08/MF A01 CSCL 13/5

A comprehensive integrated methodology for adhesive bonded joint life predictions is outlined. While poorly made joints can fail at the adherend interface, properly made joints are far stronger, tending to fail by failure in the adhesive interlayer. The approach taken herein is that the useful life of bonded joints is determined by failure in the adhesive interlayer, and this is the basis for a systematic analysis of information and the techniques required to provide valid predictions. Emphasis is placed on time-dependent fracture mechanics procedures, including detailed through-the-adhesive thickness viscoelastic finite element calculations of the stress-strain distributions, and on analytical methods involving the constitutive relations of the adhesive interlayer. Use is made of instrumented bonded joint data obtained from structural overtest

methods under a number of U.S. Air Force-sponsored programs. A logical program rationale is outlined which has sufficient generality to apply to any adhesive bonded joint structure including metal and composite adherends, various loading/environmental conditions, which apply to high-performance aircraft. GRA

N83-24702# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
ANNOTATED BIBLIOGRAPHY: POLYMERS IN CONCRETE Final Report
James E. McDonald and Edward F. ONeil Oct. 1982 595 p
(AD-A123414; WES/TR/SL-82-9) Avail: NTIS HC A25/MF A01 CSCL 11/2

Included in this bibliography are 1211 annotated references on polymers in concrete. They cover articles written between 1922 and 1981 on four major areas of polymers in concrete: polymer concrete, polymer-impregnated concrete, latex-modified concrete, and sulfur concrete. A complete subject index and author index are provided. Author (GRA)

N83-24703# Martin Marietta Labs., Baltimore, Md.
MECHANICAL PROPERTIES OF ADHESIVELY BONDED ALUMINUM STRUCTURES PROTECTED WITH HYDRATION INHIBITORS Second Year Report
D. A. Hardwick, J. S. Ahearn, and J. D. Venables Nov. 1982 41 p refs
(Contract N00014-80-C-0718)
(AD-A123403; MML-TR-23C) Avail: NTIS HC A03/MF A01 CSCL 11/1

Research has shown that an adsorbed monolayer of the organic inhibitor nitrilotris (methylene) phosphonic acid (NTMP) improves the bond durability of 2024 Al adherends prepared by phosphoric acid anodization (PAA). As had previously been determined for Forest Products Laboratories (FPL)-prepared adherends, maximum improvements in bond durability occurred when a monolayer of NTMP was adsorbed onto the surface. Examination of the wedge test failure surfaces of PAA adherends treated in NTMP revealed that although crack propagation had initially involved oxide-hydroxide conversion of the original PAA oxide, the locus of failure transfers to the adhesive near the interface quite early in the test. This means that the failure of NTMP-treated PAA adherends was predominantly cohesive through the adhesive. In addition, the presence of NTMP at the oxide/adhesive interface did not degrade the initial bond strength when epoxy-based adhesive systems were used. Author (GRA)

N83-24704# Materials Consultant Associates, Inc., Pell City, Ala.
DEVELOPMENT OF CHEMICALLY BONDED CERAMIC MATERIALS FOR USE IN THERMAL-ENERGY-STORAGE DEVICES
D. A. Brosnan 1982 7 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va., 23-25 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020827; CONF-820827-10) Avail: NTIS HC A02/MF A01

Phosphate and calcium aluminate cement bonded ceramic materials based on North Carolina olivine which are capable of serving as the heat storage media in electric furnaces using the off peak power heating concept were developed. These compositions are castable refractories formed without the conventional step of powder pressing and cured at temperatures below 315 C which eliminates the conventional ceramic firing step which requires temperatures into the range of 1370 to 1480 C for olivine bricks. Binder technologies were developed for use with NC olivines whereby phosphate bonded materials may be produced with cured densities of 2.20 g/ cu cm (138 lb/cu ft.) which can withstand heating rates of 140 C/hr to 1200 C without appreciable thermal shock damage. DOE

N83-24705# Hercules, Inc., Magna, Utah.
ON THE EFFECTS OF SPHERICAL FILLERS ON THE VISCOSITY OF SHORT-FIBER REINFORCED PLASTICS Thesis
James Branch Schutz Jul. 1982 169 p refs
(Contract W-7405-eng-36)
(DE82-021843; LA-9447-T) Avail: NTIS HC A08/MF A01

Measurement of the viscosity of suspensions of glass fibers and spheres in a silicone oil was conducted. The fibers had a fiber length distribution which was approximately log normal, with an arithmetic mean fiber Length to Diameter ratio of 17.8. Three sizes of spheres were chosen to illustrate the effect of the apparent volume of a dry mixture of fibers and spheres on the viscosity of a suspension made with those same fibers and spheres. The sphere diameter to fiber diameter ratios, also known as R, were 0.5, 2, and 7. The use of the R = 0.5 spheres minimized the apparent volume when mixed with the fibers, while the use of the R = 7 spheres maximized the apparent volume of the solids. The R = 2 sphere/fiber mixture is intermediate. The ratio of volume of fibers to the volume of solids was varied from zero to one, while the total volume of solids was held constant at 15%. The viscosity was measured at shear rates from about 12 to 4500 (1/sec). DOE

N83-24706# California Univ., Livermore. Lawrence Livermore Lab.
CRYSTALLINITY AS A SELECTION CRITERION FOR ENGINEERING PROPERTIES OF HIGH-DENSITY POLYETHYLENE
D. Mark Hoffman and Barbara M. McKinley 1982 13 p refs Presented at the 7th Intern. Conf. on Thermal Anal., Kingston, Ontario, 22-28 Aug. 1982
(Contract W-7405-eng-48)
(DE82-020496; UCRL-86894; CONF-820809-4) Avail: NTIS HC A02/MF A01

Based on differential scanning calorimetry (DSC) measurements of T/sub m/ and delta H/sub f/, eight polyethylenes of 0.96 g/cc calculated density were selected from 25 commercial HDPEs for further comparison of their properties against four design requirements. According to preliminary results from thermal expansion and creep measurements, DSC studies correctly predict the HDPE samples with superior design required properties. Clearly, the DSC was useful for screening and studying HDPE crystallization, the polymer crystal being the major physical structure responsible for improvement in three of the four design required properties. The Avrami equation proved useful for evaluating the overall crystallization kinetics of the HDPE specimens selected for their high crystallinity and melting point. DOE

N83-24707# Illinois Univ., Urbana-Champaign. Dept. of Ceramic Engineering.
ORIENTATION OF CERAMIC MICROSTRUCTURES BY HOT-FORMING METHODS Ph.D. Thesis
John Ulrich Knickerbocker 1982 195 p refs
(Contract DE-AC02-76ER-01198)
(DE83-005232; DOE/ER-01198/1396) Avail: NTIS HC A09/MF A01

Powders of layered structure compounds Bi2WO6, Bi2MoO6, PbBi2Nb2O (??) and Bi4Ti3O12 were prepared by solid state calcination and salt synthesis. Microstructures showed little grain orientation in hot pressed samples. Hot forged samples had microstructures with up to 99% grain orientation, and hot extruded samples had up to 92% grain alignment. Greater grain sizes were observed for hot forged and hot extruded microstructures than for hot pressed. Anisotropy of dielectric constant, tangent par. delta, ac conductivity, dc resistivity, ferroelectric and piezoelectric properties were measured. Significant dielectric anisotropy occurred for hot forged Bi2MoO6, PbBi2Nb2O (??) and Bi4Ti3O12, with pseudo single crystal values for PbBi2Nb2O (??) and Bi4Ti3O12. Salt synthesized powders were electrically aligned by dielectrophoretic poling prior to hot forging, and the degree of three dimensional grain orientation was determined. The best powders for dense grain oriented microstructures had small grain sizes for sintering activity, had large aspect ratios for mechanical grain alignment, and were deagglomerated for dielectrophoretic alignment. Hot forging produced the greatest combination of grain orientation and fired densities. DOE

N83-24708# Bendix Corp., Kansas City, Mo.
PREPARATION OF DIALLYL PHTHALATE PREPOLYMER SOLUTIONS

Dec. 1982 17 p Transl. into ENGLISH from Belgium patent no. 654,791, 23 Apr. 1965
(Contract DE-AC04-76DP-00613)
(DE83-005330; BDX-613-2877) Avail: NTIS HC A02/MF A01

A process is claimed for preparing prepolymers of a diallyl phthalate at room temperature is investigated. The process characteristics are that the solution of a diallyl phthalate alone or a diallyl phthalate and another copolymerizable monomer, in a liquid ketone at ambient temperature, is heated in the presence of a free radical forming catalyst, preferably hydrogen peroxide, and in the presence of a small amount of a strong acid until at least 60% and advantageously at least 90% of the monomer initially present is converted to the prepolymer. DOE

N83-24709# California Univ., Livermore. Lawrence Livermore Lab.
EVALUATION OF THE USE OF HiSil 233 IN SILICONE ELASTOMERS AND CELLULAR SILICONES
W. E. Cady, E. S. Jessop, and B. M. McKinley Aug. 1982 11 p refs
(Contract W-7405-eng-48)
(DE83-005029; UCRL-53298) Avail: NTIS HC A02/MF A01

The presence or absence of HiSil 233 SiO_2 in the reinforced gum of three silicone polymers was evaluated. It is found that this significant variation in the load deflection properties of the cellular silicones made from the three polymers and does not affect the compression set of the cellular silicones. There is no evidence that HiSil 233 is required to provide oxidation resistance during the high temperature post cure cycle of the cellular silicone. DOE

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-24710*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROPELLANT/MATERIAL COMPATIBILITY PROGRAM AND RESULTS: TEN-YEAR MILESTONES
Clifford Moran and Roy Bjorkland 15 Jul. 1982 57 p refs
(NASA-CR-170346; JPL-Publ-82-62; NAS 1.26:170346) Avail: NTIS HC A04/MF A01 CSCL 21H

The analyses and results of a test program to establish the effects of long term (10 years or more) contact of materials with earth-storable propellants for the purpose of designing chemical propulsion system components which are used for current as well as future planetary spacecraft are described. The period from the publication of JPL TM 33-779 IN 1976 through the testing accomplished in 1981 is covered. The following propellants are reported herein: hydrazine, monomethylhydrazine and nitrogen tetroxide. Materials included the following: aluminum alloys, corrosion resistant steels and a titanium alloy. The results of the testing of more than 80 specimens are included. Material ratings relative to the ten year milepost were assigned. Some evidence of propellant decomposition was found. Titanium is rated as acceptable for ten year applications. Aluminum and stainless steel alloys are also rated as acceptable with few restrictions. Author

N83-24711*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
INFLUENCE OF LIQUID WATER AND WATER VAPOR ON ANTIMISTING KEROSENE (AMK) Final Report, Aug. 1980 - Sep. 1981
A. H. Yavrouian, M. Sarolouki, and V. Sarohia Feb. 1983 79 p refs Sponsored in part by NASA
(Contract DTFA03-80-A-00215)
(NASA-CR-170280; JPL-Publ-82-80; NAS 1.26:170280) Avail: NTIS HC A05/MF A01

Experiments have been performed to evaluate the compatibility of liquid water and water vapor with antimisting kerosenes (AMK) containing polymer additive FM-9 developed by Imperial Chemical Industries. This effort consists of the determination of water solubility in AMK, influence of water on restoration (degradation) of AMK, and effect of water on standard AMK quality control methods. The principal conclusions of this investigation are: (1) the uptake of water in AMK critically depends upon the degree of agitation and can be as high as 1300 ppm at 20 C, (2) more than 250 to 300 ppm of water in AMK causes an insoluble second phase to form. The amount of this second phase depends on fuel temperature, agitation, degree of restoration (degradation) and the water content of the fuel, (3) laboratory scale experiments indicate precipitate formation when water vapor comes in contact with cold fuel surfaces at a much lower level of water (125 to 150 ppm), (4) precipitate formation is very pronounced in these experiments where humid air is percolated through a cold fuel (-20 C), (5) laboratory tests further indicate that water droplet settling time is markedly reduced in AMK as compared to jet A, (6) limited low temperature testing down to -30 C under laboratory conditions indicates the formation of stable, transparent gels. S.L.

N83-24712# Army Armament Research and Development Command, Aberdeen Proving Ground, Md. Ballistic Research Lab.
TNT EQUIVALENCY OF PENTOLITE HEMISPHERES Final Report
Dec. 1982 86 p
(AD-A123340; AD-F300164; ARBRL-TR-02456) Avail: NTIS HC A05/MF A01 CSCL 19/1

This report presents the results of a limited study designed to determine the TNT equivalency of Pentolite hemispheres detonated on a sand base. Three Pentolite charges with an average mass of 1.129 kg and two TNT charges with an average mass of 1.146 kg were detonated over a sand base test area. Blast parameters were measured along two blast lines. An average value of the TNT equivalency of Pentolite based on peak overpressure is 1.11. The average value based on impulse is 1.07. GRA

N83-24713# Ogden Air Logistics Center, Hill AFB, Utah. Propellant Analysis Lab.
PROPELLANT SURVEILLANCE REPORT LGM-30 F & G STAGE 1, PHASE G, SERIES I, TP-H1011 Semiannual Report
John A. Thompson Nov. 1982 135 p refs
(AD-A123315; MANPA-476(82)) Avail: NTIS HC A07/MF A01 CSCL 21/9

This report contains propellant test results form cartons of TP-H1011 bulk propellant representing LGM-30 F & G First Stage Minuteman motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMWRBA Project M34929C. The data from this test period are combined with data from previous testing and entered into the G085 Computer for storage, analysis, and regression analysis. From the statistical analysis of all data tested to date sixteen years for F and significant degradation of the propellant does not appear likely for at least two years past the oldest data point. Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot or group of regression plots. The data range at any age can be found by suitable inquiry of the G085 System. GRA

N83-24714# Naval Facilities Engineering Command, Alexandria, Va.
PETROLEUM FUEL FACILITIES. DESIGN MANUAL 22 Final Design Criteria
Aug. 1982 178 p refs Supersedes NAVFAC-DM-3
(AD-A123584; NAVFAC-EM-22; NAVFAC-DM-3) Avail: NTIS HC A09/MF A01 CSCL 21/4

Design criteria are presented for use by qualified engineers in designing liquid fueling and dispensing facilities. Included are basic requirements for the design of piping systems, pumps, heaters, and controls; the design of receiving, dispensing, and storage

facilities; ballast treatment and sludge removal; corrosion and fire protection; and environmental requirements. Author (GRA)

N83-24715# Whittaker Corp., North Hollywood, Calif. Shock Hydrodynamics Div.
PROJECTILE IMPACT IGNITION CHARACTERISTICS OF PROPELLANTS Final Report
W. H. Andersen Oct. 1982 19 p refs
(Contract DAAG29-80-C-0121)
(AD-A122944; ARO-17247.8-EG; Rept-3550-F) Avail: NTIS HC A02/MF A01 CSCL 19/1

The results of an investigation of the projectile impact ignition characteristics of propellants are described. Impact tests were conducted on two composite explosive propellants to determine effect of material porosity and particle size on initiation characteristics. The tests were conducted by firing different diameter, flat-nosed brass projectiles into small cylinders of the propellant at various velocities and observing the impact reaction by various sensors. Author (GRA)

N83-24716# Reinke (Ralph G.), Wausau, Wis.
DISTILLING ALCOHOL WITH WASTE AUTOMOBILE HEAT Final Report
Ralph G. Reinke 30 Jun. 1982 11 p
(Contract DE-FG02-81AF-92017)
(DE82-018727; DOE/AF-92017/T2) Avail: NTIS HC A02/MF A01

A device that utilizes the waste heat of an automobile for the production of alcohol fuel was developed. Waste heat is obtained via heat exchanger on the exhaust pipe and one on the radiator fluid line. Operation is by automatic control. Instillation of the unit is found to be too difficult. Administrative details regarding permits to distill, obtaining raw stock, and tax rules are discussed. DOE

N83-24717# Department of Energy, Washington, D. C.
REPORT TO THE CONGRESS: STRATEGIC ALCOHOL FUEL RESERVE
31 Dec. 1982 121 p
(DE83-005454; DOE/EP-0079) Avail: NTIS HC A06/MF A01

The feasibility of developing a Strategic Alcohol Fuel Reserve (SAFURE) is examined in this report. The analysis compares each of three different ethanol storage program options to that portion of the currently-planned Strategic Petroleum Reserve (SPR) which could be replaced by a particular SAFURE program. These options are: Ethanol Spare Production Capacity Utilization using essentially uneconomical, existing production capacity; Market Diversion through government purchases of ethanol for SAFURE storage, and Dedicated Plants using federal contracts to procure the entire output of five new plants. Based on this most recent analysis and other information currently available, it was concluded that the costs of acquiring, storing and managing an alcohol fuel reserve are substantially higher than the costs of the current SPR program. The net economic and security benefits of the current SPR program are also higher, and the budget costs of the SPR program are lower. DOE

N83-24718# Mason and Hanger-Silas Mason Co., Inc., Amarillo, Tex.
MALLET IMPACT TEST Final Report
George T. West Sep. 1982 14 p refs
(Contract DE-AC04-76DP-00487)
(DE83-001841; MHSMP-82-33; PDE-216) Avail: NTIS HC A02/MF A01

Small and large scale apparatus were constructed to mechanically simulate forces and durations measured on instrumented mallets during lathe centering operations using mock explosive billets. Tests were conducted on LX-10 samples. In addition to normal mallet impacts, simulation of glancing blows was attempted. There were no detectable reactions of the LX-10, although the simulated glancing blows were conducted at force levels high enough to melt the plastic hammer tip. The levels are considered much higher than those within human capability. It is concluded that the probability of LX-10 initiation as a result of an operator mallet blow is very unlikely. DOE

N83-24719# Energy and Minerals Research Co., Exton, Pa.
COAL/OIL THIXOGEL FUELS FOR DIESELS
Jaina R. Zatko, Edward N. Twesme, W. B. Tarpley, Jr., and Richard N. Wares (Bartlesville Energy Technology Center) Sep. 1982 35 p
(Contract DE-AC19-81BC-10430)
(DE83-000398; DOE/BC-10430/1) Avail: NTIS HC A03/MF A01

A thixogel of particulate coal in oil, water or methanol was developed as an alternate fuel for diesel engines. Diesel use requires ultrafine coal particles which are virtually ash free and relatively sulfur free. Ultrasonic grinding can efficiently produce ultrafine coal. The principal task remaining is to complete the ash removal process economically. Of the various physical cleaning methods investigated, comminution followed by selective agglomeration was most effective, reducing ash/sulfur contaminates up to 60%. By optimizing the laboratory methods of agglomeration, including the use of ultrasonic energy for selective coalescence and/or flow promotion, these techniques have the potential for virtually complete, economically feasible high volume cleaning. It is also recommended that coals of differing compositions be evaluated in the thixotropic gel system, to determine if the differences indicate preferential coal type use. DOE

N83-24720# Department of Energy, Pittsburgh, Pa.
TRANSPORT CHARACTERISTICS OF ALTERNATE SUPPLY FUELS Quarterly Technical Report, Apr. - Jun. 1982
J. I. Joubert 1982 13 p
(DE82-020246; DOE/NBM-2020246) Avail: NTIS HC A02/MF A01

The test series examining the effect of particle size distribution on flow properties was completed. Three separate coal particle size distributions were prepared. These three distributions were specified as nominally 85% passing 200 mesh, 70% passing 200 mesh, 50% passing 200 mesh. Tables 1, 2 and 3 present particle size data typical of each distribution. The distributions presented in each table cover the range of distributions measured for the raw coal and samples of each CWM before and after flow tests. The data presented account for essentially all of the mass in each sample; however, the analytic method does not count the number of small particles. Twenty-four flow tests were run in both loops covering coal concentrations of 0% coal, 55% coal (+- 1.5%), 60% coal (+- 1.5%), 65% coal (+- 1.5%), 67.5% coal (+- .5%) and 70.3% coal. For the one inch loop mass flow rates ranged from 19 lb/min to 145 lb/min (shear rates from approximately 65 sec(-1) to 600 sec(-1). For the two inch loop, mass flow rates ranged from 70 lb/min to 520 lb/min (shear rates from approximately 45 sec(-1) to 300 sec(-1). DOE

N83-24721# Missouri Univ., Rolla. Dept. of Mechanical Engineering.
ALCOHOL/PETROLEUM SYSTEMS AS FUELS FOR DIESEL ENGINES Final Report
Richard T. Johnson, Stig E. Friberg, and James O. Stoffer Jun. 1982 244 p refs
(Contract DE-AC02-79CS-50026)
(DE82-020752; DOE/CS-50026/1) Avail: NTIS HC A11/MF A01

Alcohol/petroleum systems containing methanol, ethanol, water, and diesel fuels were formulated and evaluated. The purpose of the work was to develop and evaluate stabilized single phase fuel systems for diesel engines. These systems contained alcohol, contamination water, and a non-ionic chemical stabilizer in a base fuel. Preliminary formulation studies of some ionic stabilizer systems were also made. Fuel formulation work led to two fuel systems using hexanol as a stabilizer: one with azeotropic ethanol as the alcohol-water fuel portion and the second using methanol with 2% by weight water added as the alcohol-water component. Fuel property and engine tests show that the behavior of these systems is similar for three different base fuels of aromatic content from 20 to 40%. For commercial engines, the stabilized fuels demonstrated little change in energy efficiency or gaseous emissions

over the base fuels. However, there were reductions in smoke and particulates, especially for the direct injection engine tested.
DOE

N83-24722# Sandia Labs., Albuquerque, N. Mex.
LARGE SCALE HYDROGEN-AIR DETONATIONS
W. B. Benedick, J. H. Lee (McGill Univ.), R. Knystautas (McGill Univ.), and C. M. Guirao (McGill Univ.) 1982 7 p ref Presented at the 2nd Intern. Workshop on the Impact of Hydrogen on Water Reactor Safety, Albuquerque, N. Mex., 3 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE82-020353; SAND-82-1841C; CONF-821026-1) Avail: NTIS HC A02/MF A01

The rich and lean detonation limits of hydrogen-air mixtures are dependent upon critical dimensions of the detonation channel. Extrapolation of laboratory scale hydrogen-air detonations, verified by some large scale detonations, increases confidence for further extrapolation to the very large dimensions associated with reactor containment buildings. The laboratory scale experiments performed at McGill University have been complemented with large scale experiments. Both rich and lean hydrogen-air mixtures were confined in thin-wall (100 microns) transparent polyethylene envelopes to provide minimum lateral support. The diameter of the envelopes ranged from 0.75 to about 2 m depending upon the mixture under study. For the critical tube diameter experiments, the polyethylene tube was attached to a steel tube which was generally smaller than the polyethylene tube. High explosive was used to launch a detonation in the steel tube, the emergent detonation wave then propagated into a larger diameter plastic envelope.
DOE

N83-24723# General Atomic Co., San Diego, Calif.
SOLAR PRODUCTION OF HYDROGEN USING THE SULFUR-IODINE THERMOCHEMICAL WATER-SPLITTING CYCLE Final Report
J. H. Norman, G. E. Besenbruch, and L. C. Brown Oct. 1982 40 p refs
(Contract DE-AC01-80CS-80004)
(DE83-005828; GA-A16493) Avail: NTIS HC A03/MF A01

A sulfur-sulfuric acid energy storage system is proposed for the General Atomic Company (GA) sulfur-iodine thermochemical water splitting cycle. In this concept sulfur is burned to sulfur dioxide in air, generating the energy needed for the hydrogen production process at night and during periods of low insolation. The product of the sulfur-burning reaction also provides one of the components (SO_2) of the main water splitting reaction. Sulfur is produced from SO_2 and water in a disproportionation reaction which also produces sulfuric acid. The SO_2 is produced by the solar thermal decomposition of sulfuric acid. The energetics of burning sulfur are a good match to the energy required for running the H_2 producing plant where 1 mole of S produces 1 mole of SO_2 which produces one mole of H_2. During useful insolation periods, the H_2 producing plant is operated directly from solar energy, H_2SO_4 is concentrated, and H_2SO_4 is thermally decomposed to SO_2, O_2, and H_2O. This scheme appears to have sufficient economic benefits that it is proposed to use this storage cycle seasonally.
DOE

N83-24724# Oak Ridge National Lab., Tenn. Chemical Technology Div.
TESTING AND VALIDATION OF THE PURDUE PHYSICAL PROPERTIES PACKAGE (PPROP) CODE
R. Salmon, W. C. Ulrich, P. J. Johnson, and J. A. Gardner Feb. 1982 82 p refs
(Contract W-7405-eng-26)
(DE82-007727; ORNL/TM-7374) Avail: NTIS HC A05/MF A01

The Purdue Physical Properties Package (PPROP) computer program was designed for the estimation of physical properties of process streams encountered in the modeling of coal conversion processes. A validation study made to determine the reliability, accuracy, and usefulness of PPROP is discussed. Computer runs were made to test the operability and range of routines and functions for estimating properties of pure components and mixtures. Results of the test runs were compared with literature to determine the accuracy of PPROP calculations for vapor-liquid equilibrium K values (vapor pressures, vapor fugacities, liquid activity coefficients, and liquid reference fugacities); isothermal and adiabatic flash calculations; enthalpies of liquids and vapors (including water and steam); pseudocomponent (mixtures defined by boiling range) properties based on American Petroleum Institute gravities, mean average boiling points, and molecular weights; gaseous volumes and densities; and sample process flowsheet problems. PPROP results agreed fairly well with published data.
DOE

N83-24725# Southwest Research Inst., San Antonio, Tex. Div. of Engines, Fuels and Lubricants.
COTTONSEED OIL AS A DIESEL-ENGINE FUEL, PART 1 Final Report
Horace E. Staph and Joseph J. Staudt 31 Jul. 1982 97 p refs Sponsored by Texas Energy and Natural Resources Advisory Council and International Harvester Company 2 Vol.
(DE83-900881; TENRAC/EDF-070-Pt-1) Avail: NTIS HC A05/MF A01

If diesel fuel becomes unavailable for any reason, can diesel powered farm equipment function on alternate fuels from energy crops that are available on the farm. This project sought to gain some insight into this question through the use of once refined cottonseed oil as fuel in a typical unmodified agricultural diesel engine. The engine used for test was a Model DT-436B 6 cylinder, inline, direct injection, turbocharged engine of approximately 175 brake horsepower at 2500 rpm. The engine was run on a stationary stand using blends of reference diesel fuel (DF-2), once refined cottonseed oil (CSO), and transesterified cottonseed oil (ESCO). The latter is cottonseed oil which was processed to give a methyl ester instead of a glyceride. The volume percent blends of fuels used in the tests ranged from 100% DF-2, to 20/80 DF-2/CSO, 50/50 DF-2/ESCO, 50/50 CSO/ESCO, and 100% ESCO. The test procedures and results are presented. The results suggest that ESCO would probably be a satisfactory substitute for diesel fuel. ESCO presently costs four to five times as much as commercial diesel fuels.
DOE

N83-24726# Southwest Research Inst., San Antonio, Tex. Div. of Engines, Fuels and Lubricants.
COTTONSEED OIL AS A DIESEL-ENGINE FUEL. PART 2: APPENDICES Final Report
Horace E. Staph and Joseph J. Staudt 31 Jul. 1982 436 p Sponsored by Texas Energy and Natural Resources Advisory Council and International Harvester Company 2 Vol.
(DE83-900880; TENRAC/EDF-070-Pt-2) Avail: NTIS HC A19/MF A01

The original data and the methods used to reduce the data obtained in performance tests on diesel engines fueled by diesel fuel, cottonseed oil, and mixtures of these fuels is presented. The description, data, and photographs relating to the 12 power curve tests are included. Results of a durability evaluation are also included.
DOE

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-24727*# Lockheed Missiles and Space Co., Sunnyvale, Calif. Missile Systems Div.
HIGH-SPEED MACHINING (HSM) OF SPACE SHUTTLE EXTERNAL TANK (ET) PANELS Final Report
Joseph A. Miller 25 Feb. 1983 89 p
(Contract NAS8-34508)
(NASA-CR-170738; NAS 1.26:170738; LMSC-D-059359) Avail: NTIS HC A05/MF A01 CSCL 13H

The External Fuel Tank (ET) of the Space Shuttle is not recovered after launch and a new one must be provided for each

launch. Currently, the external "skin" panels of the tank are produced by machining from solid wrought 2219-T87 aluminum plate stock approximately 1-3/4 inch thick. The reduction of costs in producing External Fuel Tank panels is obviously of increasing production rates and decreasing costs of the panels through the application of high-speed machining (HSM) techniques was conducted. Author

N83-24728# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.
CUTTING-FLUID CONSERVATION
K. O. Pearson 24 Mar. 1982 17 p refs
(Contract W-7405-eng-26)
(Y-2250) Avail: NTIS HC A02/MF A01

To reduce costs and meet environmental standards, a water soluble oil was tested and found to be satisfactory for multimachining operations performed on a variety of materials such as stainless steel, copper, aluminum, and many types of steel. In addition, a closed loop cutting fluid reclamation system was designed, fabricated, and installed. A cost savings was achieved in the first year following the introduction of the cutting fluid and installation of the reclamation system. An estimated annual savings is anticipated because disposal of the used cutting fluids was eliminated. S.L.

N83-24729# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
SOME PREDICTIONS OF THE NON-HOMOGENEOUS BEHAVIOUR OF CLAY IN THE TRIAXIAL TEST
J. P. Carter Jul. 1981 16 p refs
(RR-CE-26) Avail: NTIS HC A02/MF A01

Results of numerical experiments concerning the behavior of Weald clay in the triaxial apparatus are presented. In particular, attention was focussed on the relationship between the rate of axial straining, the permeability of the clay and the drainage boundary conditions of the test. It was demonstrated that, if drainage is permitted at the boundaries, then marked nonuniformity in behavior can occur within the triaxial specimen. These nonhomogeneities arise because clay has only a finite permeability and it experiences only a finite rate of straining. It is indicated that nonuniform behavior can occur even in specimens which experience no restraint at their ends. For tests in which drainage is permitted at the boundaries of the specimen, predictions were made of the effect that the rate of axial strain has upon the strength of the clay in triaxial compression. These predictions are in good agreement with test values measured by Gibson and Henkel. Author

N83-24730# Naval Research Lab., Washington, D. C. Combustion and Fuels Branch.
LARGE-SCALE PRESSURIZABLE FIRE TEST FACILITY, FIRE 1 Interim Report
J. I. Alexander, H. J. St.Aubin, J. P. Stone, T. T. Street, and F. W. Williams 30 Dec. 1982 80 p refs
(SF43400001)
(AD-A124288; NRL-8643) Avail: NTIS HC A05/MF A01 CSCL 14/2

The Naval Research Laboratory has constructed a 324 cu m pressurizable fire test facility. The chamber, equipped with multiports for electrical and gas feed-throughs and viewing, is pressurizable to over 6 atmospheres. Class A, B, and C fire tests can be conducted with real-time data collection, manipulation, graphical display, and mass storage. Continuous monitoring of CO, CO2, O2, HCN, and HBr is accomplished spectroscopically. Mass burning rates are followed through continuous weighing techniques. Smoke particles are monitored with laser and light scattering techniques. The chamber is also equipped with a nitrogen pressurization system for fire suppression. GRA

N83-24731# Newcomb and Boyd, Atlanta, Ga.
STANDARIZED EMCS ENERGY SAVINGS CALCULATIONS Final Report
Catherine Cornelius Port Hueneme, Calif. NCEL Sep. 1982 150 p
(Contract N62474-81-C-9382)
(AD-A123383; NCEL-CR-82.030) Avail: NTIS HC A07/MF A01 CSCL 12/1

This report describes standardized methods for determining energy savings obtainable from EMCS applications programs using manual and computerized algorithms. The methods will provide reasonable approximations of savings but not detailed energy analyses of building operations. Author (GRA)

N83-24732# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
EVALUATION OF THREE STATE-OF-THE-ART WATER-JET SYSTEMS FOR CUTTING/REMOVING CONCRETE Final Report
Carl E. Pace Sep. 1982 21 p
(AD-A123579; WES/MP/SL-82-15) Avail: NTIS HC A02/MF A01 CSCL 11/8

This report documents a demonstration project to evaluate the capability of three waterjet systems for cutting or removing concrete or both. The Corps of Engineers is interested in the potential of this technology for such applications as rapid cutting of bomb-damaged selection of airfield pavement and removing of deteriorated sections of concrete structures at Civil Works projects. Because water-jet systems are capable of transmitting, without mechanical constraint, all of the available horsepower of their power sources into the concrete cutting/removing operation, they may prove to be an extremely efficient means of conducting such operations. The low-pressure water jets were able to cut a 6-in. slot in the concrete for a distance of 1-1/2 ft. in a period of 24 minutes (a rate of 6.4 ft. per hour). The relatively high-pressure water jet cut at rates of 9.6 ft. per hour for shallow cuts (less than 5 in.) and 3 ft. per hour for deeper cuts (greater than 5 in.). In addition, one of the low-pressure systems was used to remove some surface concrete. The results of this evaluation indicate that, although these water-jet systems did not demonstrate a capability for efficiently cutting concrete airfield pavements, the technology has potential. The low-pressure system demonstrated a capability for removing surface concrete efficiently. GRA

N83-24733# Army Engineer Waterways Experiment Station, Vicksburg, Miss. Structures Lab.
AN ELASTIC-VISCOPLASTIC CONSTITUTIVE MODEL FOR EARTH MATERIALS Final Report
George Y. Baladi and Behzad Rohani Dec. 1982 38 p refs
(DA Proj. 4A1-61102-AT-22)
(AD-A123393; WES/TR/SL-82-10) Avail: NTIS HC A03/MF A01 CSCL 08/13

This report describes the development of a three dimensional elastic-viscoplastic work-hardening constitutive relationship for earth materials. The constitutive relationship is capable of reproducing the hysteretic behavior of the material under both hydrostatic and deviatoric states of stress; it also accounts for shear-induced volume change and the effect of superimposed hydrostatic stress on shearing response. The capability of the constitutive relationship for simulating the time-dependent response of earth materials is examined; an example fit for a clayey sand is given based on static laboratory triaxial shear and static and dynamic uniaxial strain test results. GRA

N83-24734# Oak Ridge Y-12 Plant, Tenn. Fabrication Systems Dept.
CUTTING-FLUID CONSERVATION
K. O. Pearson Mar. 1982 18 p refs
(Contract W-7405-eng-26)
(DE82-009655; Y-2250) Avail: NTIS HC A02/MF A01

To reduce costs and meet environmental standards, a water soluble oil was tested and found to be satisfactory for multimachining operations performed on a variety of materials such as stainless steel, copper, aluminum, and many types of steel. In addition, a closed loop cutting fluid reclamation system was designed and fabricated. A cost savings was achieved in the first year following the introduction of the cutting fluid and installation of the reclama-

tion system. An estimated annual savings is anticipated because disposal of the previously used cutting fluids was eliminated. DOE

N83-24735# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
DEVELOPMENT OF HEAT-STORAGE BUILDING MATERIALS FOR PASSIVE-SOLAR APPLICATIONS
J. W. Fletcher 1982 7 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va. 23-26 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020804; CONF-820827-12) Avail: NTIS HC A02/MF A01

A heat storage building material to be used for passive solar applications and general load leveling within building spaces was developed. Specifically, PCM-filled plastic panels are to be developed as wallboard and ceiling panels. Three PCMs (CaCl2, 6H2O; Na2SO4, 10H2O; LiNO3, 3H2O are to be evaluated for use in the double walled, hollow channeled plastic panels. Laboratory development of the panels will include determination of filling and sealing techniques, behavior of the PCMs, container properties and materials compatibility. Testing will include vapor transmission, thermal cycle, dynamic performance, accelerated life and durability tests. In addition to development and testing, an applications analysis will be performed for specific passive solar applications. Conceptual design of a single family passive solar residence will be prepared and performance evaluated. Screening of the three PCM candidates is essentially complete. DOE

N83-24736# Bettis Atomic Power Lab., Pittsburgh, Pa.
CHEMICAL MILLING OF ZIRCALOY TUBING TO PRODUCE INTEGRAL OD SPIRAL FINNED TUBES. AWBA DEVELOPMENT PROGRAM
W. A. Horwood Feb. 1982 41 p
(Contract DE-AC11-76PN-00014)
(DE82-022078; WAPD-TM-1515; WP-82-451/0641) Avail: NTIS HC A03/MF A01

A detailed process description is provided for producing integral spiral fins on the outside surface of Zircaloy nuclear fuel cladding tubes by masking with pressure sensitive tape strips and then chemical milling (pickling) the tube wall between the tape strips to leave the fins in relief. Fins up to 0.020 inch high by 0.05 to 0.12 inch wide were consistently produced on tubes having wall thickness of 0.008 inch or greater after fin pickling. Wall thickness uniformity was excellent. Information is provided on tube surface preparation to maximize tape mask adhesion time during pickling, acid chemistry control to prevent local tube wall thinning near the fin, and pickling techniques to promote uniform material removal. Simple fixture designs are described for quickly and conveniently applying the tape strips to the tube wall in an accurate spiral.DOE

N83-24737# Westinghouse Electric Corp., Pittsburgh, Pa.
EVALUATION OF SAFETY-PARAMETER DISPLAY CONCEPTS, VOLUME 2 Final Report
D. D. Woods, J. A. Wise, and L. F. Hanes Feb. 1982 224 p Sponsored by EPRI
(EPRI Proj. 891-5)
(DE82-902072; EPRI-NP-2239-Vol-2) Avail: NTIS HC A10/MF A01

New control room equipment designed to improve operator performance must be evaluated before adoption and installation. Two experimental concepts for a Safety Parameters Display System (SPDS) were evaluated to assess benefits and potential problems associated with the SPDS concept and its integration into control room operations. Participants were licensed utility operators undergoing retaining on a nuclear power plant simulator. Both quantitative and qualitative data were collected and analyzed on crew response to seven simulated accident conditions. Data on operator decisions and actions were organized into timelines. Analysis of the timelines and observations collected during testing provide important insights about the potential impact of the SPDS concept on control room operations. DOE

N83-24738# Fermi National Accelerator Lab., Batavia, Ill.
SENSITIVE AND SIMPLE METHOD FOR MEASURING WIRE TENSIONS
M. Atac and M. Mishina (National Lab. for High Energy Physics., Oho, Ibaraki, Japan) Aug. 1982 9 p refs
(Contract DE-AC02-76CH-03000)
(DE82-021918; FERMILAB/TM-1125) Avail: NTIS HC A02/MF A01

Measuring tension of wires in drift chambers and multiwire proportional chambers after construction is an important process because sometimes wires get loose after soldering, crimping or glueing. Wires which have tensions below a required minimum value to prevent electrostatic instabilities are sorted out. A very simple method that can be used for any type of wire chamber or proportional tube system for measuring wire tension is reported. Only a very small current is required for the wire excitation to obtain a large enough signal because it detects the induced emf voltage across a wire. A sine-wave oscillator and a digital voltmeter are sufficient devices aside from a permanent magnet to provide the magnetic field around the wire. A useful application of this method to a large system is suggested. DOE

N83-24739# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Synthetic Fuels Facilities Safety.
SAFETY ISSUES RELATED TO SYNTHETIC-FUELS FACILITIES
1982 329 p refs
(Contract DE-AC01-81EV-10659)
(DE82-017671; DOE/EV-10659/T1) Avail: NTIS HC A15/MF A01

The design, siting, construction, operation, and decommissioning of coal gasification, coal liquefaction, and oil shale facilities could present safety risks both to synfuels workers and to the environmental system unless careful controls are exercised. Many of these hazards are expected to be similar to those associated with conventional mining, mineral processing, coking operations, and refining of petroleum. However, because of the chemical and physical properties of coal and shale and their products, the types of technologies to be employed, and the scales of their operations, it has been suggested that unconventional hazards may occur. Issues which summarize the deliverations and work of the Committee on Synthetic Fuels Facilities Safety in evaluating the various technologies and their potentials for unconventional safety hazards are described in Chapters 2 and 3 of the report. DOE

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-24740 British Broadcasting Corp., Kingswood (England). Engineering Div.
SUBJECTIVE EVALUATIONS OF RECENT PRODUCTIONS OF TELEVISION WITH STEREOPHONIC SOUND
P. S. Gaskell Mar. 1983 12 p refs
(BBC-RD-1983/3) Avail: British Broadcasting Corp., Kingswood Warren, Tadworth, Surrey, Engl.

A series of subjective tests were conducted to assess the improvement given by stereophonic sound with television in comparison to the conventional monophonic equivalent. The test material consisted of extracts from eight, recently produced, television stereo programs. They represented the wide range of BBC television program output and, since some types of program were new to television stereo, their production by this means was obviously experimental. Both technically and nontechnically qualified people took part in the tests but, with a few exceptions, they returned similar subjective responses. The tests showed a marked preference for the stereo presentation. Of the eight program extracts, five gained an average of two subjective grades of

improvement. These items fell into the categories of music, sport and science fiction. The remaining program only benefitted marginally from stereo. The subjects' criticisms have suggested some modification of production techniques and it can be expected that as these are refined, viewers' enjoyment of television programs will be further enhanced by the television stereo presentation. Author

N83-24741 British Broadcasting Corp., Kingswood (England). Engineering Div.
INTERFERENCE TO TELEVISION RECEPTION FROM LARGE WIND TURBINES
J. L. Eaton, R. I. Black, and G. H. Taylor Mar. 1983 14 p refs (BBC-RD-1983/2) Avail: British Broadcasting Corp., Kingswood Warren, Tadworth, Surrey, Engl.

The interference to television reception in the future from large wind turbine generators is discussed and methods for estimating the effect from proposed installations are presented. The results of some measurements in the field are given. These show that potential interference to viewers may occur in certain areas if plans to build large wind generators come to fruition. Author

N83-24742# Contel Information Systems, Fairfax, Va.
COMPUTER B (NATIONAL AIRSPACE SYSTEM - AUTOMATED RADAR TERMINAL SYSTEMS) COMMUNICATIONS SUPPORT Final Report, 1985 - 1988
E. Heilberg Washington Federal Aviation Administration Mar. 1983 137 p refs
(Contract DOT-FA79WA-4355)
(FAA-PM-83-16; FR.341.03.0181) Avail: NTIS HC A07/MF A01

Determination of the most cost/beneficial approach to the support of Computer B (NAS-ARTS) communication in the period from 1985-1988 was performed. The identified approach would multiplex NAS-ARTS, FDIO, and possibly other communications between ARTCCs and terminal areas, such as Mode S data link traffic, onto voice grade leased line trunks. This approach would provide significant cost savings, increase NAS-ARTS throughout potential, and improve system flexibility. Author

N83-24743# Ohio State Univ., Columbus. Electroscience Lab.
THE EFFECT OF RANDOM STEERING VECTOR ERRORS IN THE APPLEBAUM ADAPTIVE ARRAY
R. T. Compton, Jr. Jun. 1982 38 p refs
(Contract N00019-81-C-0093)
(AD-A124282; ESL-713603-7) Avail: NTIS HC A03/MF A01 CSCL 09/5

This report examines the effect of random errors in the steering vector of an Applebaum adaptive array. Each component of the steering vector is assumed to have a random error component uncorrelated between elements. The array output signal-to-interference-plus-noise ratio (SINR) is computed as a function of the error variance. It is shown that the array output SINR becomes more sensitive to steering vector errors as more elements are added to the array and as the received desired signal power becomes larger. The variance of the steering error that may be tolerated depends on the required desired signal dynamic range. The larger the dynamic range that must be accommodated, the smaller the error variance must be. Author (GRA)

N83-24744# Ohio State Univ., Columbus. Electroscience Lab.
ELECTRICALLY SMALL ANTENNAS Final Report
J. H. Richmond and C. H. Walter Dec. 1982 48 p refs
(Contract DAAG29-79-C-0082)
(AD-A124364; ESL-711964-7; ARO-16258.7-EL) Avail: NTIS HC A03/MF A01 CSCL 09/5

The theory and techniques for small antennas mounted on structures, for microstrip antennas, and for k-pulse applications were investigated. The topics discussed include: mutual impedance between vertical dipoles over a flat earth; on the edge mode in the theory of TM scattering by a strip or strip grating; on the edge mode in the theory of thick cylindrical monopole antennas; field of separable electric source current distribution in free space; scattering from cylindrical inhomogeneities in a lossy medium; and propagation of surface waves on a buried coaxial cable with periodic slots. GRA

N83-24745# Lincoln Lab., Mass. Inst. of Tech., Lexington. Group 41.
MAXIMUM LIKELIHOOD ESTIMATION IN MONOPULSE PROBLEMS. PART 1. THE STRUCTURE OF THE ESTIMATORS
Edward J. Kelly 9 Dec. 1982 89 p refs
(Contract F19628-80-C-0002)
(AD-A124301; ESD-TR-82-104; TR-564) Avail: NTIS HC A05/MF A01 CSCL 17/9

Maximum likelihood methods are applied to a series of monopulse problems, involving both angle estimation and signal detection. Only the two-beam, off-boresight monopulse problem is studied. Explicit maximum likelihood estimators are obtained in Part 1, and their probability distributions will be discussed in the forthcoming Part 2. Both deterministic and stochastic signal models are used here, and maximum likelihood estimates are obtained for the single pulse case and for different models of the multiple pulse problem. Particular emphasis is given to the problem of angle estimation in correlated noise, representing the case of arbitrary interference. Author (GRA)

N83-24746# Mitre Corp., Bedford, Mass.
BISTATIC SURFACE CLUTTER RESOLUTION AREA AT SMALL GRAZING ANGLES Interim Report, Oct. 1981 - Jan. 1982
Melvin M. Weiner and P. D. Kaplan Griffiss AFB, N.Y. RADC Nov. 1982 63 p refs
(Contract F19628-82-C-0001; AF Proj. 2217)
(AD-A123660; M82-10; RADC-TR-82-289) Avail: NTIS HC A04/MF A01 CSCL 17/9

Approximate expressions for the main beam bistatic surface clutter cell area in the resolution time-limited case are determined as a function of the bistatic scattering angle for a transmitter and receiver which subtend small grazing angles at the clutter cell. The bistatic angle is the angle subtended at the clutter cell by the lines joining it to the transmitter and receiver. The shape of the clutter cell is a function of the transmitter and receiver azimuthal beamwidths, the receiver resolution time, and the time-delay difference between the clutter return and the direct signal from the transmitter to receiver. For time-delay differences much greater than the receiver resolution time, the cell shape is a parallel-ogram. For small time-delay differences, the cell shape is approximately trapezoidal or triangular at small bistatic angles and rhomboidal or hexagonal at large bistatic angles. Approximate expressions for the clutter cell area are derived for arbitrary time-delay differences. The clutter cell area increases with increasing bistatic angle and is proportional to the (squared) of one-half the bistatic angle for all angles except those approaching 180 degrees. The cell area is typically more than 30 dB larger in the forward-scattered direction than in the backscattered direction. Author (GRA)

N83-24747# Pacific-Sierra Research Corp., Los Angeles, Calif.
ULF NEAR FIELDS IN LAYERED MEDIA Final Technical Report, Nov. 1981 - Nov. 1982
E. C. Field, Jr. and C. R. Warber Oct. 1982 43 p refs
(Contract N00014-82-C-0073; NR Proj. 089-164)
(AD-A123669; PSR-1225) Avail: NTIS HC A03/MF A01 CSCL 20/14

This report derives formulas for ULF near fields using a five layer, stratified model of the earth-air-ionosphere system, and gives numerical results for a frequency of 0.1 Hz and ranges between 5 km and 5 Mm. It assumes a semi-infinite, finitely conducting ionosphere 50 km above a three layer earth, comprising a moderately conductive overburden, a resistive layer, and a highly conductive mantle. It, therefore, accommodates the two dimensional confinement of the fields between the earth and the ionosphere as well as possible waveguides in the resistive layer. However, it omits waves that might be guided in the ionospheric F-layer and ignores lateral variations in the earth's conductivity. The ionosphere is found to influence the signal by causing its range dependence to change from inverse cube to inverse square

beyond about 50 km. That result increases the maximum range predicted for ULF near field communication systems.
Author (GRA)

N83-24748# Rome Air Development Center, Griffiss AFB, N.Y. Electromagnetic Sciences Div.
STATISTICAL ANALYSIS OF THE EFFECT OF PHASE QUANTIZATION ON ARRAY ANTENNA SIDELOBES
Robert A. Shore Jun. 1982 67 p refs
(AF Proj. 2305)
(AD-A123704; RADC-TR-82-190) Avail: NTIS HC A04/MF A01 CSCL 20/14

General expressions for the mean and variance of the power at an arbitrary location in the pattern are derived for a linear array of isotronic equispaced elements. The phases of the element excitation coefficients are assumed to be set by digital phase shifters, causing random phase errors uniformly distributed in the interval of plus to minus the least significant bit of the phase command. Approximations valid for small phase errors are obtained. For large arrays, the variance of the power at a location where the error free pattern has a null is approximately equal to the square of the mean of the power. The theoretical results are compared with Monte Carlo computer simulations. The Kolmogorov-Smirnov test usually shows close agreement between the simulation and the theoretical results. However, the test also shows that the depths of multiple nulls are not statistically independent when there are multiple nulls in the error free pattern; the probability distribution of the depth of the least deep null is closer to the distribution predicted for a single null than it is to the distribution for multiple nulls. Author (GRA)

N83-24749# Magnavox Co., Fort Wayne, Ind.
SOLID STATE EMC TECHNOLOGY DEVELOPMENT Final Technical Report, 13 Mar. 1980 - 1 Jul. 1982
John G. Mohr and Richard W. Stroud Griffiss AFB, N.Y. RADC Nov. 1982 127 p refs
(Contract F30602-80-C-0136; AF Proj. 2338)
(AD-A123705; RADC-TR-82-280; FWD82-4284A) Avail: NTIS HC A07/MF A01 CSCL 17/2

Critical superheterodyne receiver parameters were studied and evaluated to extend the dynamic range and reduce the spurious responses of UHF receivers operating in a high-level RF environment. An up-conversion receiver front end using a surface acoustic wave filter for initial IF selectivity was assembled and evaluated. A single conversion receiver was evaluated using high-level, low-distortion elements. Also, a low-noise, high-level, synthesizer/VCO was designed for receiver local oscillator injection and transmitter frequency excitation. A solid state transmitter was modified to minimize the spurious output and broadband noise levels. A solid state demonstration receiver/transmitter suitable for airborne testing was assembled using the optimized circuits and electrical tests were made on the completed transceiver.
Author (GRA)

N83-24750# Rhode Island Univ., Kingston. Dept. of Electrical Engineering.
ESTIMATING THE PARAMETERS OF EXPONENTIALLY DAMPED OR UNDAMPED SINUSOIDAL SIGNALS IN NOISE Technical Progress Report, Feb. 1981 - Jul. 1982
Ramdas Kumaresan Oct. 1982 123 p refs
(Contract N00014-81-K-0144)
(AD-A123177; TR-2) Avail: NTIS HC A07/MF A01 CSCL 17/2

We address the problem of estimating the parameters of a signal embedded in noise. The signal is composed of samples of a sum of M exponentially damped or undamped sinusoidal signals. We suggest improvements to the original approach proposed by Prony. He observed that the samples s(n) obey an M th order difference equation and that from the roots of the characteristic polynomial of the difference equation, the parameters (sk) can be determined. We present three methods to improve this approach when the signal is noise corrupted. GRA

N83-24751# Institute for Defense Analyses, Alexandria, Va. Science and Technology Div.
IMPEDANCE AND CURRENT OF INSULATED AND END-GROUNDED LINEAR ANTENNAS IN SEAWATER Final Report, Dec. 1980 - Sep. 1982
Giorgio V. Borgiotti Sep. 1982 96 p refs
(Contract MDA903-79-C-0202)
(AD-A123345; AD-E500560; IDA/HQ-82-24518; IDA-P-1661) Avail: NTIS HC A05/MF A01 CSCL 09/5

This paper provides a comprehensive account of analytical results for computing the antenna impedance and the equivalent length of a linear antenna, either insulated or end-grounded, immersed in a conducting medium. The theoretical results and the concomitant computer codes are directly applicable to the analysis of the sensitivity and thermal noise of a submerged cable antenna. GRA

N83-24752# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
A FINITE ELEMENT COMPUTATION OF THE ELECTROMAGNETIC FIELDS WITHIN AN ENGINE INLET MODEL M.S. Thesis
Thomas Gerard Cooper Dec. 1982 73 p refs
(AD-A124684; AFIT/GE/EE/82D-25) Avail: NTIS HC A04/MF A01 CSCL 20/14

The method of coupled azimuthal potentials (CAP) was applied to a waveguide model of an axially symmetric engine inlet to analyze the fields in the region where the front face of the engine terminates the waveguide. Appropriate boundary conditions were derived and the finite element method was used to solve for the potentials. The Lagrangian of the CAP equations does not provide for the enforcement of Neumann boundary conditions. This prevents exact implementation of the correct boundary conditions for the azimuthal magnetic field. Dirichlet boundary conditions for the azimuthal electric and magnetic fields were enforced for standing wave condition in the inlet model with a conducting flat plate termination. The computed values for the interior field components were compared by evaluating the standard deviation. Three trials were performed with varying finite element mesh densities. It was found that as the mesh density increased, the standard deviation for the computed field components decreased.
Author (GRA)

N83-24753# M/A-COM LINKABIT, Inc., San Diego, Calif.
A ROBUST RATIO-THRESHOLD TECHNIQUE TO MITIGATE TONE AND PARTIAL BAND JAMMING IN CODED FREQUENCY HOPPED COMMUNICATION LINKS Final Report
Sep. 1982 40 p refs
(Contract N00019-81-C-0451)
(AD-A123559) Avail: NTIS HC A03/MF A01 CSCL 17/2

Frequency hopping has long been regarded as an effective technique to thwart intentional and unintentional interference. The latter includes also fading and multipath. An advantage of frequency hopping, as compared to direct sequence spread spectrum techniques, is that phase coherence is not required. This makes frequency hopped systems more robust, since they are dependent on one less parameter, which is particularly significant for fading channels wherein rapid phase variations make it difficult if not impossible to track. On the negative side, noncoherent systems performance is inferior to coherent systems, particularly when the number of bits per hop is small (or worse yet, fractional). More serious is the fact that tone or partial band jammers can cause severe degradations (of orders of magnitude) relative to full band Gaussian jammers. GRA

N83-24754# Stanford Univ., Calif. Electronics Labs.
PERFORMANCE EVALUATION OF MULTIHOP PACKET RADIO SYSTEMS Final Report, 6 Aug. 1979 - 5 Nov. 1982
Fouad A. Tobagi 4 Dec. 1982 22 p refs
(Contract DAAG29-79-C-0138)
(AD-A123574; ARO-16783.6-EL-A) Avail: NTIS HC A02/MF A01 CSCL 17/2

This is the final report for the research carried out at the

Computer Systems Laboratory under ARO contract number DAAG 27-79-C-0138 during the period from August 6, 1979 to November 5, 1982. The research effort related to packet radio systems and their evaluation. Throughout the contract period, the effort mainly focused on one important aspect underlying these networks, namely the channel access problem. GRA

N83-24755# Florida Univ., Gainesville. Engineering and Industrial Experiment Station.
PRELIMINARY ANALYSIS OF AN FM/CW SYSTEM OPERATING OVER A DISTRIBUTED FLAT-SURFACE TARGET
Peyton Z. Peebles, Jr. Jun. 1982 28 p refs
(Contract DAAK21-81-C-0116; DA Proj. 1L6-62616-AB-77)
(AD-A124323; HDL-CR-82-116-3) Avail: NTIS HC A03/MF A01 CSCL 17/9

The power spectrum of the intermediate-frequency (IF) output of an FM/CW system is found when the system is operating over a flat surface. General equations for a homogeneous surface are derived and a specific example is worked out in detail for vertically incident systems. Author (GRA)

N83-24756# Scientific Research Associates, Inc., Glastonbury, Conn.
NOISE AND THERMAL CONTRIBUTIONS IN TRANSFERRED ELECTRON TWO AND THREE TERMINAL DEVICES Final Report, 15 Aug. 1981 - 30 Sep. 1982
H. I. Grubin and J. P. Kreskovsky Jan. 1983 113 p refs
(Contract DAAG29-81-C-0033)
(AD-A124326; SRA-R93-0007-F; ARO-18681.6-EL-2) Avail: NTIS HC A06/MF A01 CSCL 20/14

A description of recent studies on noise in two and three terminal compound semiconductor devices, as well as numerical studies of GaAs FET Y parameters is given. Studies of thermal effects and space charge limited FET behavior in compound semiconductors is briefly described. Author (GRA)

N83-24757# Illinois Univ., Urbana. Electromagnetics Lab.
ANALYSIS OF THE SUSPENDED H-WAVEGUIDE AND OTHER RELATED DIELECTRIC WAVEGUIDE STRUCTURES Interim Technical Report
T. N. Trinh and R. Mittra Jan. 1983 154 p refs
(Contract DAAG29-82-K-0084)
(AD-A124342; UIEM-83-1; UILU-ENG-83-2538; ARO-18054.5-EL) Avail: NTIS HC A08/MF A01 CSCL 09/5

In this thesis, the field and propagation characteristics of many dielectric waveguide structures that are of direct importance to the areas of millimeter-wave integrated circuits are studied. A rigorous method of analysis of the propagation constants and the field distributions of a newly developed suspended H-waveguide based on the mode matching techniques is described. The derived eigenvalue equation for determining the propagation constant of this waveguide structure is very general and can be applied directly to other planar dielectric structures of rectangular cross section. However, for applications where only approximate values of the propagation constants are necessary, simple effective parameter approximations are employed. Even though the effective parameter approximations do not provide very accurate results for the propagation constants in some cases, they always provide useful information on the whereabouts and the existences of certain modes which, in turn, can be used as the initial values for iterating in the more rigorous mode matching technique. As frequency increases, the values obtained by the effective parameter technique approach those obtained by the mode matching method. GRA

N83-24758# Naval Research Lab., Washington, D. C. Communications Systems Engineering Branch.
IMPROVEMENT OF THE NARROWBAND LINEAR PREDICTIVE CODER. PART 1: ANALYSIS IMPROVEMENTS Interim Report
G. S. Kang and S. S. Everett 27 Dec. 1982 47 p refs
(RR0210542)
(AD-A124313; AD-E000525; NRL-8645) Avail: NTIS HC A03/MF A01 CSCL 17/2

The narrowband linear predictive coder (LPC) is widely used in both civilian and military applications. Yet, in spite of the many improvements over the years, it is still not universally acceptable to general users. This report presents improvements to five aspects of the LPC analysis which have drawn little attention in the past. These improvements are frequency spreading of sibilant sound spectra, adaptive placement of the analysis window at onsets, modified LPC analysis for sustained vowels, enhancement of LPC spectra in noise, and an automatic gain control. These improvements may be incorporated in the existing narrowband LPC without interfering with the speech sampling rate, the frame rate, or the parameter coding. GRA

N83-24759# Stanford Univ., Calif. Dept. of Electrical Engineering.
RESEARCH ON ALGORITHMS FOR ADAPTIVE ARRAY ANTENNAS Interim Report, Feb. 1981 - Feb. 1982
Bernard Widrow, R. Gooch, and T. AuTruong Griffiss AFB, N.Y. RADC Nov. 1982 58 p refs
(Contract F30602-80-C-0046; AF Proj. 2305)
(AD-A123419; RADC-TR-82-297) Avail: NTIS HC A04/MF A01 CSCL 09/5

This report demonstrates a method for implementing a wide-band constrained array processor using filters possessing both poles and zeros. The idea of constrained array processing is introduced and an optimal array weighting formula is derived. This optimal weighting is meant to cancel m-1 wide-band interference sources incident on an m-element array with a constrained look direction. From the optimal weighting formula, it becomes evident that the use of filters possessing both poles and zeros to perform the frequency-dependent weighting has the potential for improving the wide-band nulling capability of the array. A novel method for adapting the pole-zero array filters in tap-delay-line form using the LMS or RLS algorithm is presented. The issue of look-direction signal bias and stability of the inverse filter are addressed. Author (GRA)

N83-24760# Princeton Univ., N. J. Information Sciences and Systems Lab.
ALTERNATIVES TO OPTIMAL DETECTION Ph.D. Thesis - Technical Report, Feb. 1981 - Oct. 1982
Yih-Fang Huang, John B. Thomas, and S. C. Schwartz Nov. 1982 125 p refs
(Contract N00014-81-K-0146)
(AD-A123454; TR-8) Avail: NTIS HC A06/MF A01 CSCL 09/4

In this report, signal detection in non-Gaussian noise is considered. This work can be divided roughly into two parts. The essential purpose of the first part is to investigate the existence and design of some sub-optimal detectors which are modifications of the sample mean detector. The method used here is based on orthogonal series expansions in terms of the Gaussian distribution and the moments of the noise distribution. The second part is concerned with signal detection in bounded noise. Both the known signal case and the unknown signal case are studied. An algorithm of a sequential nature is devised. GRA

N83-24761# Polytechnic Inst. of New York, Farmingdale. Microwave Research Inst.
QUASI-OPTIC STUDIES OF DIELECTRIC RADOMES AND LENSES Final Report
Leopold B. Felsen and Alex Hessel 14 Dec. 1982 13 p
(Grant DAAG29-78-G-0168)
(AD-A124371; POLY-MRI-1424-82; ARO-15369.2-EL) Avail: NTIS HC A02/MF A01 CSCL 20/14

This grant has been concerned with work on the transmission and guiding characteristics of dielectric radomes and lenses. Emphasis has been placed on novel techniques that promise: (a) to facilitate the near-to-far field transition calculations for highly collimated distributed aperture fields, and (b) to facilitate the systematize ray-optical treatment of multiple reflections inside the radome, of curvature effects, of wave trapping, and guiding, etc. In case (a), the investigation centered on complex ray

methods. In case (b), it lead to a new and rigorous procedure for treating the prototype cylindrical shell Green's function in terms of ordinary and composite ray fields, with the latter accounting collectively for multiple internally reflected rays. The accomplishments suggest that these procedures offer a promising new approach to the radome problem. GRA

N83-24762# California Univ., Livermore. Lawrence Livermore Lab.
EFFECTS OF UNEQUAL INPUT-OUTPUT SAMPLING RATES ON THE IDENTIFICATION OF ELECTROMAGNETIC-TRANSIENT SYSTEMS
E. J. Bogdan and G. A. Clark Aug. 1982 115 p refs Sponsored in part by DNA
(Contract W-7405-eng-48)
(DE82-021685; UCID-19488) Avail: NTIS HC A06/MF A01

Some limitations on the identification of electromagnetic systems based on input and output data of different record lengths and sampling rates are discussed. This problem has come to attention when trying to process internal data for the A-7E A-7E scale model in the Large Scale Model Measurement Program. The problems arise due to limitations of the measurement equipment and computer algorithms used to process the data. Because the input and output records must have the same sampling rates to be processed, considerable data preprocessing must be done to ensure that this condition exists. Three such preprocessing methods are included for comparison, demonstrated with examples, and the second one is concluded to be preferred for general use. Included are examples of the identification of a system model for each of the above three cases, along with a brief discussion of each. Brief mention is made of the importance of proper windowing of truncated data sequences in order to obtain correct Fourier transforms using the discrete Fourier transform. Examples demonstrate the importance of windowing properly. DOE

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-24763* National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PYROELECTRIC DETECTOR ARRAYS Patent
Archibald L. Fripp, James B. Robertson, and Roger Breckenridge, inventors (to NASA) Issued 13 May 1982 4 p Filed 13 May 1982
(NASA-Case-LAR-12363-2; US-Patent-4,379,970;
US-Patent-Appl-SN-377892; US-Patent-Class-250-388) Avail: US Patent and Trademark Office CSCL 09A

A pyroelectric detector array and the method for using it are described. A series of holes formed through a silicon dioxide layer on the surface of a silicon substrate forms the mounting fixture for the pyroelectric detector array. A series of nontouching strips of indium are formed around the holes to make contact with the backside electrodes and form the output terminals for individual detectors. A pyroelectric detector strip with front and back electrodes, respectively, is mounted over the strips. Biasing resistors are formed on the surface of the silicon dioxide layer and connected to the strips. A metallized pad formed on the surface of layer is connected to each of the biasing resistors and to the film to provide the ground for the pyroelectric detector array. Official Gazette of the U.S. Patent and Trademark Office

N83-24764*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ADVANCED ELECTRICAL POWER SYSTEM TECHNOLOGY FOR THE ALL ELECTRIC AIRCRAFT
Robert C. Finke and Gale R. Sundberg 1983 15 p refs Presented at the 35th Ann. Natl. Aerospace and Electron. Conf. (NAECON '83), Dayton, Ohio, 17-19 May 1983
(NASA-TM-83390; E-1667; NAS 1.15:83390) Avail: NTIS HC A02/MF A01 CSCL 09C

The application of advanced electric power system technology to an all electric airplane results in an estimated reduction of the total takeoff gross weight of over 23,000 pounds for a large airplane. This will result in a 5 to 10 percent reduction in direct operating costs (DOC). Critical to this savings is the basic electrical power system component technology. These advanced electrical power components will provide a solid foundation for the materials, devices, circuits, and subsystems needed to satisfy the unique requirements of advanced all electric aircraft power systems. The program for the development of advanced electrical power component technology is described. The program is divided into five generic areas: semiconductor devices (transistors, thyristors, and diodes); conductors (materials and transmission lines); dielectrics; magnetic devices; and load management devices. Examples of progress in each of the five areas are discussed. Bipolar power transistors up to 1000 V at 100 A with a gain of 10 and a 0.5 microsec rise and fall time are presented. A class of semiconductor devices with a possibility of switching up to 100 kV is described. Solid state power controllers for load management at 120 to 1000 V and power levels to 25 kW were developed along with a 25 kW, 20 kHz transformer weighing only 3.2 kg. S.L.

N83-24765*# Battelle Columbus Labs., Ohio.
DESIGN AND FABRICATION OF CONVENTIONAL AND UNCONVENTIONAL SUPERCONDUCTORS Final Report, 17 Mar. 1980 - 15 Apr. 1983
E. W. Collings 15 Apr. 1983 234 p refs
(Contract NAS8-33722)
(NASA-CR-170753; NAS 1.26:170753) Avail: NTIS HC A11/MF A01 CSCL 09C

The design and fabrication of conventional and unconventionally processed Ti-Nb base and Al5-compound-base, respectively, composite superconductors is discussed in a nine section review. The first two sections introduce the general properties of alloy and compound superconductors, and the design and processing requirements for the production of long lengths of stable low loss conductor. All aspects of flux jump stability, and the general requirements of cryogenic stabilization are addressed. Conductor design from an a.c.-loss standpoint; some basic formulae describing hysteretic and eddy current losses and the influences on a.c. loss of filament diameter, strand (conductor) diameter, twist pitch, and matrix resistivity are discussed. The basic techniques used in the fabrication of conventional multifilamentary conductors are described. Author

N83-24766*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUMERICAL COMPUTATIONS ON ONE-DIMENSIONAL INVERSE SCATTERING PROBLEMS Final Report
Mark H. Dunn and S. I. Harihan Apr. 1983 18 p refs
(Contracts NAS1-16394; NAS1-17070; NAS1-17130)
(NASA-CR-166114; NAS 1.26:166114; Rept-83-5) Avail: NTIS HC A02/MF A01 CSCL 09C

An approximate method to determine the index of refraction of a dielectric obstacle is presented. For simplicity one dimensional models of electromagnetic scattering are treated. The governing equations yield a second order boundary value problem, in which the index of refraction appears as a functional parameter. The availability of reflection coefficients yield two additional boundary conditions. The index of refraction by a k-th order spline which can be written as a linear combination of B-splines is approximated. For N distinct reflection coefficients, the resulting N boundary value problems yield a system of N nonlinear equations in N unknowns which are the coefficients of the B-splines. S.L.

N83-24767# Rochester Univ., N. Y. Dept. of Computer Science.

VLSI IMPLEMENTATION OF ODD-EVEN SORTER USING A UNIFORM LADDER
Iliroyuki Watanabe Nov. 1981 18 p refs
(TR-85) Avail: NTIS HC A02/MF A01

Experimental designs of a sorting chip are described. The design implements an odd-even network sorter using a data structure called a uniform ladder. The algorithm is highly parallel. The designs attempt to transform this parallel algorithm directly into the hardware. Two designs are described: one using a parallel comparator, and the other a serial comparator. Author

N83-24768*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
COUPLING AN INDUCTION MOTOR TYPE GENERATOR TO A-C POWER LINES Patent Application
Frank J. Nola, inventor (to NASA) Filed 31 Mar. 1983 18 p
(NASA-Case-MFS-25302-2; US-Patent-Appl-SN-481086) Avail: NTIS HC A02/MF A01 CSCL 09A

A system for connecting an induction motor type generator to an A.C. power line is described in which an electronic switch is controlled and regulated to turn on at a relatively late point in each half cycle of its operation. The energizing power supplied by the line to the induction motor type generator is decreased and the net power delivered to the line is increased. NASA

N83-24769*# National Aeronautics and Space Administration. Pasadena Office, Calif.
SPLIT-CROSS-BRIDGE-RESISTOR FOR TESTING FOR PROPER FABRICATION OF INTEGRATED CIRCUIT Patent Application
Martin G. Buehler, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 26 Jul. 1982 31 p Sponsored by NASA
(NASA-Case-NPO-16021-1; US-Patent-Appl-SN-402205) Avail: NTIS HC A03/MF A01 CSCL 09C

An electrical testing structure and method whereby a test structure is fabricated on, e.g., a large scale integrated circuit wafer along with the circuit components is described. It has a van der Pauw cross resistor in conjunction with a bridge resistor and a split bridge resistor, the latter having two channels each a line width wide, corresponding to the line width of the wafer circuit components, and with the two channels separated by a space equal to the line spacing of the wafer circuit components. The testing structure has associated voltage and current contact pads arranged in a two by four array for conveniently passing currents through the test structure and measuring voltages at appropriate points to calculate the sheet resistance, line width, line spacing, and line pitch of the circuit components on the wafer electrically. NASA

N83-24770# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A 40 MHz - 2.2 MHz DOWNCONVERTER [CONVERSOR DE 40 MHZ PARA 2,2 MCHZ]
Celso Dantas dosSantos Dec. 1982 27 p refs In PORTUGUESE; ENGLISH summary
(INPE-2607-NTE/194) Avail: NTIS HC A03/MF A01

The amplifier, mixing circuits, crystal oscillator, and bandpass filter are described for a frequency converter to be used in the radar measurement of wind velocity in the mesosphere at an altitude of 110 km. Block diagrams are included along with equations for determining the circuits required. Transl. by A.R.H.

N83-24771*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROCIRCUIT RADIATION EFFECTS DATABANK
Feb. 1983 418 p refs
(NASA-TM-85328; NAS 1.15:85328) Avail: NTIS HC A18/MF A01 CSCL 09C

This databank is the collation of radiation test data submitted by many testers and serves as a reference for engineers who are concerned with and have some knowledge of the effects of the natural radiation environment on microcircuits. It contains radiation sensitivity results from ground tests and is divided into two sections. Section A lists total dose damage information, and section B lists single event upset cross sections, I.E., the probability of a soft error (bit flip) or of a hard error (latchup). Author

N83-24772# Naval Air Engineering Center, Lakehurst, N.J. Ship and Shore Installations Engineering Dept.
CAPACITY SELECTOR VALUE ELECTRONICS ENCLOSURE ASSEMBLY CONTROLLER CARD ASSEMBLY TEST SPECIFICATIONS Final Report
Thomas Olszewski 28 Dec. 1982 101 p
(AD-A123539; NAEC-ENG-91-7999) Avail: NTIS HC A06/MF A01 CSCL 09/1

This document is a test procedures for the printed circuit board in the electronic enclosure assembly of the capacity selector valve system. The test are intended to be only functional screening tests for the assembled. GRA

N83-24773# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
MISE: MACHINE FOR IN-SYSTEM EVALUATION OF CUSTOM VLSI CHIPS Interim Report
R. Bisiani, M. J. Foster, H. T. Kung, and K. Oflazer Aug. 1982 20 p refs
(Contracts N00014-76-C-0370; N00014-80-C-0236; F33615-81-K-1539)
(AD-A123334; CMU-CS-82-132) Avail: NTIS HC A02/MF A01 CSCL 09/2

This paper identifies some of the key research problems that one encounters in specifying, designing, testing and demonstrating a custom chip in relation to the application system in which it will be used, and proposes a system called MISE (Machine For In-System Evaluation) to be a solution to the issues raised. GRA

N83-24774# Columbia Research Corp., Gaithersburg, Md.
AUTOMATION OF PRE-CAP VISUAL INSPECTION FOR INTEGRATED CIRCUITS Final Report, 1981 - 1982
David Flake, George Fisher, Paul Watson, and Gary Niemiec (Army Armament Research and Development Command, Dover, N.J.) Dover, N.J. Army Armament Research and Development Command Dec. 1982 59 p
(AD-A123343; AD-E400926; ARPAD-CR-82002) Avail: NTIS HC A04/MF A01 CSCL 14/2

The feasibility of an automatic inspection system which can perform a 100% internal visual inspection of integrated circuits (ICs) during production was investigated. Columbia Research Corporation (CRC) reviewed technical approaches and the feasibility of applying them to production. They also surveyed the companies currently developing automated IC inspection systems and found that no commercial contractor has installed equipment for routine inspection on a production basis. This project was terminated because the necessary equipment is still undergoing design and evaluation. GRA

N83-24775# Westinghouse Electric Corp., Baltimore, Md. Advanced Technology Lab.
CARRIER TRANSPORT STUDY IN SILICON DEVICES: ELECTRICAL AND OPTICAL STUDIES OF MULTI-LAYER INSULATORS FOR MEMORY DEVICE APPLICATIONS Final Report, 20 Feb. 1979 - 30 Sep. 1982
J. R. Szedon, T. A. Temofonte, K. Vedam (Pennsylvania State Univ.), and R. N. Ghoshtagore 30 Oct. 1982 71 p refs
(Contract DAAG29-79-C-0026)
(AD-A123648; ARO-15824.1-MS) Avail: NTIS HC A04/MF A01 CSCL 20/3

We have studied the electrical and optical behavior of specimens from a 3x5 matrix, considering three deposition temperatures. In addition to a set of unannealed specimens at each deposition temperature, four sets of annealed samples were prepared at each temperature, for high and low temperature treatments in hydrogen and in nitrogen. By excluding results for specimens prepared at 750 Deg. C, except those receiving anneals at 1000 Deg. C in either hydrogen or nitrogen, we found clear direct effects of annealing on all the parameters of preliminary interest. The results of spectroscopic ellipsometry analysis indicate

that the film structure of the specimen with the baseline silicon nitride is significantly different from the films deposited at higher temperature. It does not have an ellipsometrically detectable layer of silicon dioxide at the silicon surface. The stability of the memory states associated with the pulsed write and clear conditions correlated with the final density of fast surface states, except for anomalous behavior of the 750 Deg. C, unannealed specimen. Author (GRA)

N83-24776# Harry Diamond Labs., Adelphi, Md.
RAYLEIGH'S METHOD APPLIED TO A CONDUCTING LIQUID DROP IN THE PRESENCE OF A POINT CHARGE
Clyde Morrison and Richard Leavitt Jan. 1983 23 p
(AD-A123670; HDL-TL-83-1) Avail: NTIS HC A02/MF A01 CSCL 04/1

The method that Rayleigh formulated in 1879 is used to determine the effect of a point charge on the natural frequencies of a charged drop. Explicit expressions are derived for the resonant frequencies and the deformation of the charged drop. The results are expressed in terms of sums over particular types of Clebsch-Gordon coefficients and more complicated sums. Further work is necessary before practical application of the results can be made. Author (GRA)

N83-24777# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
DESIGN AND IMPLEMENTATION OF A SINGLE-CHIP 1-D MEDIAN FILTER Interim Report
Kemal Oflazer Apr. 1982 28 p refs
(Contracts N00014-76-C-0370; N00014-80-C-0236; F33615-81-K-1539; Grant NSF MCS-78-23676; ARPA Order 3597; NR Proj. 044-0422; NR Proj. 048-659)
(AD-A123328; CMU-CS-82-115) Avail: NTIS HC A03/MF A01 CSCL 09/5

The design and implementation of a 1 Dimensional median filter in VLSI is presented. The device is designed to operate an 8-bit sample sequences with a window size of 5 samples. Extensive pipelining and employment of systolic concepts at the bit level enable the chip to filter at rates up to 10 Mega-samples per second. The chip is designed to be implemented with a lambda = 2.5 micro NMOS technology and is 6.2 mm by 5.0 mm in size. A circuit configuration for using the chip in approximate 2 D median filtering is also presented. GRA

N83-24778# Cornell Univ., Ithaca, N. Y.
MICROWAVE SEMICONDUCTOR RESEARCH: MATERIALS, DEVICES, CIRCUITS. GaAs BALLISTIC ELECTRON TRANSISTORS USING BURIED METAL GATES Annual Technical Report, 1 May 1981 - 30 Apr. 1982
L. F. Eastman, D. W. Woodward, C. E. C. Wood, G. Wicks, J. Ballantyne, C. L. Tang, H. J. Carlin, W. H. Ku, and G. J. Wolga Dec. 1982 62 p refs
(Contract F49620-77-C-0069)
(AD-A123299) Avail: NTIS HC A04/MF A01 CSCL 20/12

This program covers the growth and assessment of Gallium Arsenide, and related compounds and alloys, for use in microwave, millimeter, and optical devices. It also covers the processing of the material into devices, and the testing of the devices. Both molecular beam epitaxy (MBE) and organo-metallic vapor phase epitaxy (OMVPE) are used for growth. Modulation doped heterostructures and very short gate field effect transistors are two areas covered. The following is a list of tasks pursued. Author (GRA)

N83-24779# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ADVANCED ELECTRONIC TECHNOLOGY Quarterly Technical Summary Report, 1 May - 31 Jul. 1982
Alan J. McLaughlin and Alan L. McWhorter 15 Aug. 1982 28 p
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A123581; ESD-TR-82-084) Avail: NTIS HC A03/MF A01 CSCL 09/3

Contents includes: Data Systems; Digital Integrated Circuits, Introductions, RVLSI Circuits, Restructurable VLSI Technology, Semiconductor Processing, and Device Theory. Computer Systems: Solid State, Division 8 Reports on Advanced Electronic Technology, Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. GRA

N83-24780# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
SYNCHRONIZING LARGE SYSTOLIC ARRAYS Interim Report
Allan L. Fisher and H. T. Kung Apr. 1982 16 p refs Sponsored in part by NSF
(Contracts F33615-81-K-1539; N00014-76-C-0370; N00014-80-C-0236; NR Proj. 048-659; NR Proj. 044-422; RR042060A; ARPA Order 3597)
(AD-A123374; CMU-CS-82-133) Avail: NTIS HC A02/MF A01 CSCL 09/3

Parallel computing structures consist of many processors operating simultaneously. If a concurrent structure is regular, as in the case of systolic array, it may be convenient to think of all processors as operating in lock step. Totally synchronized systems controlled by central clocks are difficult to implement because of the inevitable problem of clock skews and delays. An alternate means of enforcing necessary synchronization is the use of self-timed, asynchronous schemes, at the cost of increased design complexity and hardware cost. Realizing that different circumstances call for different synchronization methods, this paper provides a spectrum of synchronization models; based on the assumptions made for each model, theoretical lower bounds on clock skew are derived, and appropriate or best-possible synchronization schemes for systolic arrays are proposed. This paper represents a first step towards a systematic study of synchronization problems for large systolic arrays. GRA

N83-24781# Michigan Univ., Ann Arbor. Electron Physics Lab.
CAPABILITIES AND POTENTIAL OF MILLIMETER-WAVE IMPATT DEVICES Interim Report, Mar. 1981 - Aug. 1982
R. K. Mains and G. I. Haddad Wright-Patterson AFB, Ohio AFWAL Nov. 1982 162 p refs
(Contract F33615-81-K-1429; AF Proj. 2002)
(AD-A123380; AFWAL-TR-82-1141; TR-159) Avail: NTIS HC A08/MF A01 CSCL 09/1

Theoretical investigations of IMPATT diodes are carried out at 30, 40, 60 and 94 GHz. GaAs, Si and InP diodes are simulated. Several single- and double-drift doping profiles are considered. Extensive results as a function of RF voltage amplitude and dc current density are presented. Taking thermal resistance into account, the expected CW performance of each structure is presented, such that the maximum allowable diode temperature is 525 deg K. Matching each device to 1-ohm circuit resistance gives an estimate of maximum obtainable pulsed power. Finally, CW and pulsed performance for all structures and materials are compared over the entire frequency range simulated. Author (GRA)

N83-24782# Illinois Univ., Urbana. Decision and Control Lab.
ADJUSTMENT OF DESIGN PARAMETERS FOR IMPROVED FEEDBACK PROPERTIES IN THE LINEAR QUADRATIC REGULATOR M.S. Thesis
Robert Stanley McEwen Mar. 1982 97 p refs
(Contract N00014-79-C-0424)
(AD-A124494; UILU-ENG-82-2207; DC-50; R-941) Avail: NTIS HC A05/MF A01 CSCL 12/1

Classical analysis and design methods for single input-single output (SISO) systems, such as gain and phase margins, do not generalize easily to MIMO systems. Recently, the singular values of the return difference and inverse Nyquist matrices have proven useful in analyzing multiple input-multiple output (MIMO) systems. The linear quadratic formulation is useful for the design of MIMO controllers. A disadvantage of this design method is that all the design specifications must be incorporated into a quadratic cost functional. This thesis contains a systematic method for adjusting the quadratic cost to manipulate the singular value functionals and the feedback properties and thus achieve the design requirements. Author (GRA)

N83-24783# Wright State Univ., Dayton, Ohio. Dept. of System Engineering.

CONVERSION OF EXISTING CONTINUOUS CONTROL SYSTEMS INTO DIGITAL CONTROL SYSTEMS

Kuldip S. Rattan 1982 7 p refs

(Grant AF-AFOSR-0132-81; AF Proj. 2304)

(AD-A123167; AFOSR-82-1076TR) Avail: NTIS HC A02/MF A01 CSCL 09/1

The problem of converting existing continuous-data control systems into digital control systems is considered. The objective of this paper is to develop a computer-aided method for synthesizing the pulse-transfer function of the digital controller. This is done by matching the frequency response of the digital control system to that of the continuous system with a minimum weighted mean square error. Formulas for computing the parameters of the digital controller are obtained as a result. The design technique is illustrated with a numerical example and a comparison with previous methods is also presented. GRA

N83-24784# California Univ., Berkeley. Dept. of Physics.

MICROWAVE MIXING AND DIRECT DETECTION USING SIS AND SIS' QUASIPARTICLE TUNNEL JUNCTIONS

A. D. Smith, W. R. McGrath, P. L. Richards, R. E. Harris (National Bureau of Standards, Boulder, Colo.), F. L. Lloyd (National Bureau of Standards, Boulder, Colo.), E. Prober (Yale Univ.), and P. Santhanam (Yale Univ.) 30 Nov. 1982 4 p refs Presented at the Appl. Superconductivity Conf., 1982 Submitted for publication

(Contract N00014-75-C-0496)

(AD-A123554) Avail: NTIS HC A02/MF A01 CSCL 09/5

Quasiparticle mixers have shown strong quantum effects, conversion gain, and noise levels approaching the quantum limit, but only in tunnel junctions with very low sub-gap 'leakage' conductance. It has been suggested that SIS' tunnel junctions, made from two different conductors with unequal gaps, will function as high gain mixers since the dynamic conductance below the gap is nagative. GRA

N83-24785# Naval Research Lab., Washington, D. C. Plasma Physics Div.

DESIGN OF ELECTRON-BEAM CONTROLLED SWITCHES Interim Report

V. E. Scherrer, I. M. Vitkovitsky, R. J. Commisso, and R. F. Fernsler 14 Nov. 1982 29 p refs

(RR0110941)

(AD-A124312; AD-E000526; NRL-MR-4975) Avail: NTIS HC A03/MF A01 CSCL 20/7

This paper reviews the principles of operation of the electron-beam controlled switch (EBCS) and presents a procedure for its design. The EBCS is compared to other switches which have potential application to repetitively pulsed, high power systems, and is found to have some substantial advantages at high (greater than approximately 10 kHZ) repetition rates. Circuit requirements for the application of an EBCS to ETA/ATA like devices are outlined. A self-consistent formalism for optimum switch design is derived. The formalism is applied to the previously outlined circuit requirements using capacitive and capacitive-inductive hybrid energy storage schemes. The required switches are readily designed. GRA

N83-24786# Texas A&M Univ., College Station. Research Foundation.

DETECTION OF ARCING FAULTS ON DISTRIBUTION FEEDERS Final Report

B. D. Russell Dec. 1982 134 p refs

(EPRI Proj. 1285-3)

(DE83-900993; EPRI-EL-2757) Avail: NTIS HC A07/MF A01

The problem of detecting high impedance faults is examined from the perspective of current utility protection practices and it is shown why conventional overcurrent protection systems may not detect such faults. A microcomputer based prototype of an arcing, high impedance fault detector was tested. The fault detection technique is based on an increase in the high frequency component of distribution feeder current caused by the arcing associated with many high impedance faults. This theory is supported by field data measurements and analysis of a large number of staged distribution primary faults and normal system conditions. The design and demonstration of the prototype is explained. The device successfully detected many faults of greater than 5 to 10 A on a typical distribution feeder without false trips. General application of this fault detection techniques is considered. DOE

N83-24787# Sandia Labs., Albuquerque, N. Mex. Div. 1116.

VALIDATION DIAGNOSTICS FOR DEFECTIVE THERMOCOUPLE CIRCUITS

R. P. Reed 1982 9 p refs Presented at the 6th Symp. on Temp., Washington, 14-18 Mar. 1982 Submitted for publication

(Contract DE-AC04-76DP-00789)

(DE82-012778; SAND-82-1518C; CONF-820306-9) Avail: NTIS HC A02/MF A01

Thermocouples, properly used under favorable conditions, can measure temperature with an accepted tolerance. However, when improperly applied or exposed to hostile mechanical, chemical, thermal, or radiation environments, they often fail without the error being evident in the temperature record. Conversely, features that appear to be unreasonable in temperature records can be authentic. When hidden failure occurs during measurement, deliberate recording of supplementary information is necessary to distinguish valid from faulty data. Loop resistance change, circuit isolation, isolated noise potential, and other measures can reveal symptoms of developing defects. Monitored continually along with temperature, they can reveal the occurrence, location, and natures of damage incurred during measurement. Special multiterminal branched thermocouple circuits and combinatorial multiplex switching allow detection of dc measurement noise and decalibration. Symptoms of insidious failure, often consequential, are illustrated by examples from field experience in measuring temperature of a propagating retorting front in underground coal gasification. DOE

N83-24788# Bendix Corp., Kansas City, Mo. Technical Communications.

CHANNEL PLATING

M. E. Evans Sep. 1982 31 p ref

(Contract DE-AC04-76DP-00613)

(DE82-021687; BDX-613-2819) Avail: NTIS HC A03/MF A01

A system for applying thick coatings of photoresist to thin copper clad laminate for manufacturing printed wiring boards was developed. Using this system, circuits were made with narrow conductors and spacing. Although plating within the channels defined by the resist was successful, circuit fabrication was precluded because of defective laminate materials. Laminate materials clad with copper 0.005 and 0.009 mm thick were found to have a high incidence of foreign metallic inclusions. DOE

N83-24789# California Univ., Livermore. Lawrence Livermore Lab.

NORMAL ZONE DETECTORS FOR A LARGE NUMBER OF INDUCTIVELY COUPLED COILS

Earl W. Owen and Daniel W. Shimer 10 Jan. 1983 96 p refs

(Contract W-7405-eng-48)

(DE83-005416; UCID-19659) Avail: NTIS HC A05/MF A01

In order to protect a set of inductively coupled superconducting magnets, it is necessary to locate and measure normal zone voltages that are small compared with the mutual and self-induced voltages. The method described uses two sets of voltage measurements to locate and measure one or more normal zones in any number of coupled coils. One set of voltages is the outputs of bridges that balance out the self-induced voltages. The other set of voltages can be the voltages across the coils, although alternatives are possible. The two sets of equations form a single combined set of equations. Each normal zone location or combination of normal zones has a set of these combined equations associated with it. It is demonstrated that the normal zone can be located and the correct set chosen, allowing determination of the size of the normal zone. Only a few operations take place in a working detector: multiplication of a constant, addition, and simple

decision making. In many cases the detector for each coil, although weakly linked to the other detectors, can be considered to be independent. DOE

N83-24790# Brookhaven National Lab., Upton, N. Y.
H5 FAST-KICKER-MAGNET PULSER
W. Frey, S. Ghoshroy, and J. G. Cottingham 1982 6 p Presented at the 1982 15th Power Modulator Symp., Baltimore, 14-16 Jun. 1982
(Contract DE-AC02-76CH-00016)
(DE82-020002; BNL-31427; CONF-82062-10) Avail: NTIS HC A02/MF A01

The fast extraction kicker magnet for the AGS is powered by a pulse generator. A pulse forming network (PFN) is discharged into nearly 100% mismatched load. The pulser delivers a current pulse of 3000 amperes peak pulse with a 2% flap top ripple into a 1.4 micron H single turn ferrite core magnet. The pulse is 2.8 microsec with a 180 nsec rise time, at a 0.5 to 1.5 pps repetition rate. The pulse rise time is required to provide clean extraction of the 28 GeV proton beam by bringing the kicker magnet field up to 1.25 kG within the 220 nsec space between proton bunches in the machine. The pulsar is mounted adjacent to the kicker magnet in the AGS ring. The thyratron's characteristics are not affected by the ionizing radiation environment during operation of the AGS (Alternating Gradient Synchrotron). DOE

N83-24791# Eaton Corp., Southfield, Mich. Engineering and Research Center.
ELECTRIC-HYBRID-VEHICLE SIMULATION
Dan C. Pasma 1982 7 p refs Presented at the US DOE Phys. and Chem. Storage Branch Contractors' Rev. Meeting, Arlington, Va., 23-26 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020838; CONF-820827-15) Avail: NTIS HC A02/MF A01

The simulation of electric hybrid vehicles is to be performed using experimental data to model propulsion system components. The performance of an existing ac propulsion system will be used as the baseline for comparative purposes. Hybrid components to be evaluated include electrically and mechanically driven flywheels, and an elastomeric regenerative braking system. DOE

N83-24792# Los Alamos Scientific Lab., N. Mex.
STUDY OF CERTAIN PLANE SPIRAL DEFLECTING SYSTEMS OF TRAVELING-WAVE TUBES
Z. A. Vainoris, K. Yu. Matseika, and S. S. Shtaras 1983 13 p refs Transl. into ENGLISH from Radioelektronika (USSR), Tom 4, 1968 p 67-76
(Contract W-7405-eng-36)
(DE83-005024; LA-TR-83-2) Avail: NTIS HC A02/MF A01

A two screened spiral deflecting system was studied. Dispersion properties, the dependence of the wave resistance on the frequency and distribution of the electric field in the cross section for constant power transmitted are analyzed. The two spiral deflecting system properties are examined. DOE

N83-24793# Kanner (Leo) Associates, Redwood City, Calif.
DISPERSION PROPERTIES OF SPIRAL DEFLECTING SYSTEMS
Z. A. Vainoris, K. Yu. Matseika, and S. S. Shtaras 1983 19 p refs Transl. into ENGLISH from A Sb. Nauch. Tr. Konf. Radioelektron. (USSR), vol. 3, 1967 p 29-45 Prepared for LASL, N. Mex.
(Contract W-7405-eng-36)
(DE83-005025; LA-TR-83-1) Avail: NTIS HC A02/MF A01

The dispersion properties of spiral deflecting systems of traveling wave electron ray tubes were analyzed. Systems with rectangular, circular and elliptical cross sections are considered. It is shown that the cause of the dispersion of the phase holding time in spiral deflecting systems with homogeneous dielectric is the electromagnetic bond between the individual sections of the spiral. To reduce this dispersion systems consisting of a spiral placed between two screens are used, while the dispersion in the systems with extensive elliptical and rectangular cross sections is less than for circular spiral deflecting systems. In deflecting systems with different dielectrics in the internal and external regions of the spiral the dispersion may arise because of the redistribution of the electromagnetic field and its value depends on the ratio of the dielectric permeabilities and the transversal dimensions of the system. Simple approximate expressions to determine the slowing down for very low and high frequencies are presented. DOE

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-24794*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AEROTHERMAL ENVIRONMENT IN CONTROL SURFACE GAPS IN HYPERSONIC FLOW: AN OVERVIEW
Allan R. Wieting, Joanne L. Walsh, and Kim S. Bey Apr. 1983 10 p refs Presented at 18th AIAA Thermophys. Conf., Montreal, 1-3 Jun. 1983
(NASA-TM-84662; NAS 1.15:84662; AIAA-83-1483) Avail: NTIS HC A02/MF A01 CSCL 20D

Experimental and analytical research to develop an understanding of the fluid and thermal environment in control surface gaps such as the spanwise gap of the wing elevon and chordwise gap of a split elevon configuration typical of the Space Shuttle are summarized. Although the experimental and analytical studies were initiated too late to significantly impact the Shuttle design they do provide a fundamental understanding of the basic fluid/thermal environment in control surface gaps and help to establish a firm data base for vehicle design. S.L.

N83-24795*# Pennsylvania State Univ., University Park. Dept. of Mechanical Engineering.
THE STRUCTURE OF EVAPORATING AND COMBUSTING SPRAYS: MEASUREMENTS AND PREDICTIONS Semiannual Status Report, 1 Sep. 1982 - 28 Feb. 1983
J-S. Shuen, A. S. P. Solomon, and F. M. Faeth Mar. 1983 37 p refs
(Grant NAG3-190)
(NASA-CR-170312; NAS 1.26:170312) Avail: NTIS HC A03/MF A01 CSCL 20D

The structure of particle-laden jets and nonevaporating and evaporating sprays was measured in order to evaluate models of these processes. Three models are being evaluated: (1) a locally homogeneous flow model, where slip between the phases is neglected and the flow is assumed to be in local thermodynamic equilibrium; (2) a deterministic separated flow model, where slip and finite interphase transport rates are considered but effects of particle/drop dispersion by turbulence and effects of turbulence on interphase transport rates are ignored; and (3) a stochastic separated flow model, where effects of interphase slip, turbulent dispersion and turbulent fluctuations are considered using random sampling for turbulence properties in conjunction with random-walk computations for particle motion. All three models use a k-e-g turbulence model. All testing and data reduction are completed for the particle laden jets. Mean and fluctuating velocities of the continuous phase and mean mixture fraction were measured in the evaporating sprays. A.R.H.

N83-24796*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
CALCULATION OF WING RESPONSE TO GUSTS AND BLAST WAVES WITH VORTEX LIFT EFFECT
Der-Chang Chao and C. Edward Lan Apr. 1983 67 p refs
(Grant NAG1-75)
(NASA-CR-170340; NAS 1.26:170340; TR-CRINC-FRL-467-1) Avail: NTIS HC A04/MF A01 CSCL 20D

A numerical study of the response of aircraft wings to

atmospheric gusts and to nuclear explosions when flying at subsonic speeds is presented. The method is based upon unsteady quasi-vortex lattice method, unsteady suction analogy and Pade approximant. The calculated results, showing vortex lag effect, yield reasonable agreement with experimental data for incremental lift on wings in gust penetration and due to nuclear blast waves. Author

N83-24797*# Old Dominion Univ., Norfolk, Va. School of Science and Health Professions.
HIGHER MODES OF THE ORR-SOMMERFELD PROBLEM FOR BOUNDARY LAYER FLOWS Final Report, 1 Sep. 1981 - 31 Aug. 1982
William D. Lakin and C. E. Grosch Apr. 1983 42 p refs
(Grant NAG1-175)
(NASA-CR-170343; NAS 1.26:170343) Avail: NTIS HC A03/MF A01 CSCL 20D

The discrete spectrum of the Orr-Sommerfeld problem of hydrodynamic stability for boundary layer flows in semi-infinite regions is examined. Related questions concerning the continuous spectrum are also addressed. Emphasis is placed on the stability problem for the Blasius boundary layer profile. A general theoretical result is given which proves that the discrete spectrum of the Orr-Sommerfeld problem for boundary layer profiles (U(y), 0,0) has only a finite number of discrete modes when U(y) has derivatives of all orders. Details are given of a highly accurate numerical technique based on collocation with splines for the calculation of stability characteristics. The technique includes replacement of 'outer' boundary conditions by asymptotic forms based on the proper large parameter in the stability problem. Implementation of the asymptotic boundary conditions is such that there is no need to make apriori distinctions between subcases of the discrete spectrum or between the discrete and continuous spectrums. Typical calculations for the usual Blasius problem are presented. S.L.

N83-24798*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A REFRIGERATED DYNAMIC SEAL
R. C. Hendricks 1983 10 p refs Proposed for presentation at Cryogenic Engr. Conf./Intern. Cryogenic Mater. Conf., Colorado Springs, 15-19 Aug. 1983
(NASA-TM-83378; E-1649; NAS 1.15:83378) Avail: NTIS HC A02/MF A01 CSCL 11A

A new sealing concept is proposed where the fluid to be sealed flows through a refrigerated housing or constriction, is frozen to the housing during the transient phase, and under steady state conditions provides a dynamic seal with essentially 'zero' leakage. Author

N83-24799*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE EFFECT OF ANNEALING ON THE CREEP OF PLASMA SPRAYED CERAMICS
R. C. Hendricks, G. McDonald, and R. L. Mullen (Case Western Reserve Univ.) 1983 18 p refs Presented at 7th Ann. Conf. on Ceramics and Advanced Mater., Cocoa Beach, Fla., 16-23 Jan. 1983; sponsored by American Ceramic Society
(NASA-TM-83396; E-1673; NAS 1.15:83396) Avail: NTIS HC A02/MF A01 CSCL 20D

The creep of plasma sprayed ZrO2-8Y2O3 was measured at temperatues from 98 to 1250 C (180 to 220 F), and compared to creep of identical samples after annealing at temperatures from 98 to 1316 C (1800 to 2400 F). Loads and temperatures which produced significant creep of as sprayed ceramics produced no creep after annealing. Author

N83-24800*# National Bureau of Standards, Boulder, Colo. Thermophysical Properties Div.
TRANSPORT PROPERTIES OF OXYGEN
H. M. Roder Apr. 1983 86 p refs
(NASA Order C-32369-C)
(NASA-RP-1102; NAS 1.61:1102; NBSIR-82-1672) Avail: NTIS HC A05/MF A01 CSCL 20D

Tables of viscosity, thermal conductivity, and thermal diffusivity of oxygen as a function of temperature and pressure from the triple point to 320 K and at pressures to 100 MPa are presented. Auxiliary tables in engineering units are also given. Viscosity and thermal conductivity are calculated from published correlations. Density and specific heat at constant pressure, required to calculate thermal diffusivity, are obtained from an equation of state. The Prandtl number can be obtained quite easily from the values tabulated. S.L.

N83-24801# Oak Ridge National Lab., Tenn. Computer Sciences.
SOME ASPECTS OF THE COMPUTER SIMULATION OF CONDUCTION HEAT TRANSFER AND PHASE CHANGE PROCESSES
A. D. Solomon Apr. 1982 14 p refs
(Contract W-7405-eng-26)
(ORNL/CSD-100) Avail: NTIS HC A02/MF A01

Various aspects of phase change processes in materials including computer modeling, validation of results and sensitivity are discussed. In addition, the possible incorporation of cognitive activities in computational heat transfer are examined. S.L.

N83-24802# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
SHAPE EFFECTS ON RESISTANCE TO FLOW IN SMOOTH SEMI-CIRCULAR CHANNELS
A. K. Kazemipour and C. J. Apelt Nov. 1980 29 p refs
(RR-CE-18) Avail: NTIS HC A03/MF A01

Information on the variation of boundary shear, friction factor and shape effects of flowing water in a semicircular open channel is lacking at the present stage. In pipes flowing partly full there is a pronounced discontinuity in the discharge curves for depths greater than half the diameter. A series of experiments with smooth semicircular channels was designed and carried out to study the effects of channel shape on resistance in the case of semicircular channels. The results of these experiments are of interest not only for the study of shape effects but also in providing a comparison between the resistance to flow in channels of other cross sectional shapes and in a semicircular one for which very little data is available in the literature. Author

N83-24803# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
AN EXPERIMENTAL STUDY OF BLOCKAGE EFFECTS ON SOME BLUFF PROFILES
G. S. West Apr. 1981 20 p refs
(RR-CE-23) Avail: NTIS HC A02/MF A01

The constraints imposed by the walls of a wind or water tunnel distort the flow field round a model so that simple scaling of test results does not give a true representation of conditions in an unconfined flow. Effective correction procedures were developed for airfoils to allow for these secondary effects but they are less effective for bluff body flows. In an attempt to clarify this situation, experimental results for 5 bluff profiles over a range of blockage ratios were tested against the two generally accepted correction methods. Some general conclusions are drawn about their applicability. Author

N83-24804# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
EFFECTS OF LAMINAR BOUNDARY LAYER ON A MODEL BROAD-CRESTED WEIR
L. T. Isaacs Sep. 1981 21 p refs
(RR-CE-28) Avail: NTIS HC A03/MF A01

An approximate method for the analysis of flow with a laminar boundary layer over a model broad crested weir is described. The method was used to demonstrate the effects of the laminar boundary layer and the results show that these effects are significant. If the energy is calculated from depth and discharge measurements, large energy losses appear to occur at low flow rates in laboratory experiments. Losses real and apparent, are

explained and the methods presented may be used to estimate the correct energy values. S.L.

N83-24805# Federal Aviation Administration, Atlantic City, N.J. Technical Center.
ANALYSIS OF DISSIPATION OF GASEOUS EXTINGUISHER AGENTS IN VENTILATED COMPARTMENTS Final Report
Thor I. Eklund May 1983 27 p refs
(FAA Proj. 181-350-400)
(FAA-CT-83-1) Avail: NTIS HC A03/MF A01

A perfect stirrer model was used to analyze the concentration decay of extinguisher agents in ventilated compartments. The exponential decay curves were integrated over time to yield dosages. In this way, extinguisher agent weights, compartment volumes, and ventilation rates were matched against allowable agent doses to yield selection nomographs for halon 1211, halon 1301, and carbon dioxide. The model predictions were compared with experimental data, and the concept of an effective airchange time was developed for practical application. Author

N83-24806*# Texas A&M Univ., College Station. Dept. of Engineering Technology.
COMPUTER MODELING OF HEAT PIPE PERFORMANCE Final Report
George P. Peterson 13 Jan. 1983 26 p refs
(Contract NAS9-16606)
(NASA-CR-171641; NAS 1.26:171641) Avail: NTIS HC A03/MF A01 CSCL 20D

A parametric study of the defining equations which govern the steady state operational characteristics of the Grumman monogroove dual passage heat pipe is presented. These defining equations are combined to develop a mathematical model which describes and predicts the operational and performance capabilities of a specific heat pipe given the necessary physical characteristics and working fluid. Included is a brief review of the current literature, a discussion of the governing equations, and a description of both the mathematical and computer model. Final results of preliminary test runs of the model are presented and compared with experimental tests on actual prototypes. M.G.

N83-24807# National Aerospace Lab., Tokyo (Japan).
AN EXPERIMENTAL AND ANALYTICAL STUDY OF SPRAY FLOW FIELDS FORMED BY LIQUID-GAS COAXIAL INJECTOR ELEMENTS (2)
Nobuyuki Yatsuyanagi 1982 89 p refs In JAPANESE; ENGLISH summary
(NAL-54-745; ISSN-0389-4010) Avail: NTIS HC A05/MF A01

An experimental and analytical study of the spray flow field formed by recessed post concentric tube injector elements is presented. And also the analytical model which was derived by the author was applied to calculate the spray flow field under the same conditions as those of experiments which had been reported in various literature. By the experimental works the following results were noted. The recessed post elements exhibited good mixing efficiencies between the liquid droplets and the gas phase, compared to the flush face elements. And the coefficient k, which is the ratio of the half width of liquid phase mass flux to that of the gas phase velocity, was proved to be the analogous Schmidt number of the spray, if it was considered to have the average density of a two phase flow. Author

N83-24808*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CALCULATION OF INVISCID FLOW OVER SHUTTLE-LIKE VEHICLES AT HIGH ANGLES OF ATTACK AND COMPARISONS WITH EXPERIMENTAL DATA
K. James Weilmuenster and H. Harris Hamilton, II May 1983 90 p refs
(NASA-TP-2103; L-15518; NAS 1.60:2103) Avail: NTIS HC A05/MF A01 CSCL 20D

A computer code HALIS, designed to compute the three dimensional flow about shuttle like configurations at angles of attack greater than 25 deg, is described. Results from HALIS are compared where possible with an existing flow field code; such comparisons show excellent agreement. Also, HALIS results are compared with experimental pressure distributions on shuttle models over a wide range of angle of attack. These comparisons are excellent. It is demonstrated that the HALIS code can incorporate equilibrium air chemistry in flow field computations. S.L.

N83-24809# Clemson Univ., S.C. Dept. of Mechanical Engineering.
EXPERIMENTAL INVESTIGATION OF HIGH PERFORMANCE, SHORT, THRUST AUGMENTING EJECTORS Final Report
Tah-teh Yang, Francois Ntone, and Jiang Tong Jan. 1983 68 p refs
(Contract N00167-81-C-0087)
(AD-A125529; CU-ME-F-2-82; DTNSRDC-ASED-CR-2-83) Avail: NTIS HC A04/MF A01

Air-to-air thrust augmenting ejectors utilizing short curved wall diffusers were designed and tested. Two of the three ejectors tested have identical mixing chambers with an inlet area to the primary nozzle area ratio lambda of 40. The overall ejector length-to-mixing chamber diameter ratios (L/D) were 6.09 and 6.16; diffuser area ratios were 1.33 and 1.46, respectively. The third ejector had an overall L/D of 6.02, a lambda of 20, and diffuser area ratio of 1.26. The best observed thrust augmentation ratio and the modified thrust augmentation ratio were 2.11 and 1.91 respectively for a sonic primary jet. The modified thrust augmentation ratio accounts for the penalty of suction in preventing flow separation in the diffuser. These levels of thrust ratio were derived from velocity measurements at the ejector exit. Independent thrust measurements obtained with strain gages on the mixing chamber agree with the force calculated from the momentum data. The experimentally observed ejector performance data correlate well with the predicted values. A.R.H.

N83-24810# Wisconsin Univ., Madison. Mathematics Research Center.
THE BIDIMENSIONAL STEFAN PROBLEM WITH CONVECTION: THE TIME-DEPENDENT CASE Technical Summary Report
J. R. Cannon (Texas Univ., Austin), E. DiBenedetto (Indiana Univ., Bloomington), and G. H. Knightly (Massachusetts Univ., Amherst) Sep. 1982 51 p refs
(Contract DAAG29-80-C-0041)
(AD-A124377; MRC-TSR-2432) Avail: NTIS HC A04/MF A01 CSCL 12/1

This paper considers the time dependent Stefan problem with convection in the fluid phase governed by the Stokes equation, and with adherence of the fluid on the lateral boundaries. The existence of a weak solution is obtained via the introduction of a temperature dependent penalty term in the fluid flow equation, together with the application of various compactness arguments. Consider a phenomenon (such as melting of ice) where there is a change of phase, say liquid-solid. In the liquid phase the thermal energy is transported both by diffusion and convection, and the effects of convection are reflected in the movement of the free-boundary separating the two phases. This paper shows that such a problem can be formulated mathematically and that it admits a solution in a week sense. Also investigated are some local regularity properties of the distribution of temperature and the field of velocities in the liquid phase. GRA

N83-24811# Wisconsin Univ., Madison. Mathematics Research Center.
CAPILLARY SURFACE CONTINUITY ABOVE IRREGULAR DOMAINS Technical Summary Report
Nicholas J. Korevaar Oct. 1982 40 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-2062)
(AD-A124384; MRC-TSR-2439) Avail: NTIS HC A03/MF A01 CSCL 12/1

There are simple domains omega in R/Q having re-entrant corners for which the variational solution MU to the capillary problem exists, is bounded, but does not extend continuously to partial omega. GRA

N83-24812# Wisconsin Univ., Madison. Mathematics Research Center.
CONTINUUM MODELING OF TWO-PHASE FLOWS Technical Summary Report
Donald A. Drew (Rensselaer Polytechnic Inst.) Oct. 1982 24 p refs
(Contract DAAG29-80-C-0041)
(AD-A124385; MRC-TSR-2438) Avail: NTIS HC A02/MF A01 CSCL 20/4

The equation of conservation of mass and momentum for two-phase flows are derived by applying a generic averaging process. The properties of this averaging process are discussed. Constitutive equations are proposed for the interfacial force. In addition, simple assumptions are made for the Reynolds stresses and the fluid viscosity. These assumptions are examined for transition layers. Author (GRA)

N83-24813# Wisconsin Univ., Madison. Mathematics Research Center.
VISCOUS FLOW OF A DROPLET ON A FLAT SURFACE Technical Summary Report
Donald A. Drew Oct. 1982 18 p refs
(Contract DAAG29-80-C-0041)
(AD-A124396; MRC-TSR-2435) Avail: NTIS HC A02/MF A01 CSCL 20/4

The motion of a thin droplet on a flat surface is described using the lubrication flow approximation. The equation of motion for the drop reduces to a partial differential equation for the evolution of the drop thickness. Special solutions of this equation are obtained when the surrounding fluid is streaming, impinging and separating. Author (GRA)

N83-24814# Science Applications, Inc., Wayne, Pa.
MANEUVERING AEROTHERMAL TECHNOLOGY (MAT) PROGRAM. A METHOD FOR COUPLED THREE-DIMENSIONAL INVISCID AND INTEGRAL BOUNDARY LAYER CALCULATIONS Final Report, 16 May 1980 - 15 Feb. 1982
Darryl W. Hall, Thomas B. Harris, Alvin L. Murray, and Calvin J. Wolf Norton AFB, Calif. AFBMO May 1982 140 p refs
(Contract F04701-80-C-0033)
(AD-A123468; BMO-TR-82-37; SAI-067-83R-006) Avail: NTIS HC A03/MF A01 CSCL 20/4

A procedure is developed for computing the complete flow field over maneuvering reentry vehicles by coupling a finite difference inviscid flow field code to an integral boundary layer procedure. Viscous calculations are performed along inviscid surface streamlines, which are explicitly computed in the inviscid code. The detailed inviscid flow field solution is used to accurately define the required boundary layer edge properties. The boundary layer procedure can treat laminar, transitional, or turbulent flows, and surface roughness and mass addition effects. Approximate techniques are provided to define the wall temperatures and mass addition rates of ablating heatshields. Author (GRA)

N83-24815# Naval Research Lab., Washington, D. C.
STABILITY CHARACTERISTICS FOR FLOWS OF THE VORTEX SHEET TYPE
Y. T. Fung 23 Dec. 1982 28 p refs
(RR0230141)
(AD-A123344; AD-E000520; NRL-MR-4978) Avail: NTIS HC A03/MF A01 CSCL 20/9

The interfacial conditions for a cylindrical vortex sheet or a cylindrical fluid layer obtained earlier are examined further for the case of incompressible fluids. Only temporal perturbations are considered. Unlike the single role of destabilization played by the velocity in two dimensional stratified flows or axisymmetric jet flows, the rotating velocity in vortex motions plays a dual role in flow stability. The radial velocity gradient generates tangential shear and the fluid rotation creates a centrifugal force field. While the former always destabilizes the flow, the latter can either stabilize or destabilize the flow depending upon whether the resultant force field is centrifugally stable or unstable. These characteristics are demonstrated by examining three general types of perturbations. We further show that deformations of the vortex sheet or the fluid layer affect the flow field in two ways: disturbing the total pressure field and perturbing the centrifugal force field created by the azimuthal components of the velocity and magnetic fields. The latter, even though it seems to be straightforward, has often been overlooked in previous analyses. It is shown that failure to consider such a perturbation to a stable centrifugal force field will lead to the improper destabilization of modes with smaller axial and azimuthal wave numbers. GRA

N83-24816# Stanford Univ., Calif. Thermosciences Div.
AN EXPERIMENTAL STUDY OF THE DYNAMICS OF AN UNSTEADY TURBULENT BOUNDARY LAYER Final Report, 1 Oct. 1979 - 30 Sep. 1982
Rangarajan Jayaraman, Pradip Parikh, and William C. Reynolds Dec. 1982 219 p refs Sponsored in part by NASA
(Contracts ARO-1-80; ARO-2-81; ARO-1-82)
(NASA-CR-170278; NAS 1.26:170278; AD-A124365; TF-18; ARO-16760.2-EG) Avail: NTIS HC A10/MF A01 CSCL 20/4

Turbulent boundary layers with a time-dependent free-stream velocity occur in many fluid dynamic devices. The main objectives of the present work are as follows: to understand the characteristics of a turbulent boundary layer that develops under steady, zero-pressure gradient condition upstream, and is subjected to well-defined and sinusoidally varying adverse free-stream gradient downstream, and to provide a definitive data set that would serve as a test case for evaluating the performance of calculation procedures and turbulence models for such flows. Author (GRA)

N83-24817# Colorado Univ., Boulder. Dept. of Mechanical Engineering.
ANALYTICAL PREDICTION OF TURBULENT HEAT TRANSFER PARAMETERS Annual Report, 1 Oct. 1981 - 30 Sep. 1982
Adrian Bejan Dec. 1982 104 p refs
(Contract N00014-79-C-0006; RR0240302; NR Proj. 097-431)
(AD-A123321; CUMER-82-6; AR-2) Avail: NTIS HC A06/MF A01 CSCL 20/14

The objective of this research is to construct a purely theoretical foundation for the phenomenon of turbulent heat transfer. In the present report the elastic buckling properties of inviscid flow are used to reconstruct classical features of turbulent behavior. The report also contains two experiments designed to visualize the buckling of high Reynolds number flow. Author (GRA)

N83-24818# Army Materials and Mechanics Research Center, Watertown, Mass.
ADIABATIC DEFORMATION AND STRAIN LOCALIZATION Final Report
Gregory B. Olson, John F. Mescall, and Morris Azrin Aug. 1982 36 p refs
(DA Proj. 1L1-61102-AH-42)
(AD-A123695; AMMRC-TR-82-48) Avail: NTIS HC A03/MF A01 CSCL 09/2

The strain localization phenomenon of adiabatic shear is generally attributed to a plastic instability arising from a thermal softening effect during adiabatic or near-adiabatic plastic deformation. Strain localization was studied under conditions of both quasistatic and dynamic deformation. Application to the simulation of ballistic penetration is in progress. Experimental evidence indicates the existence of a pressure-dependent strain softening effect attributed to subcritical shear microcracks which contributes to shear instability in mild steels. This phenomenon may also operate in high-strength steels, giving rise to a pressure-dependent beta parameter. Experiments are designed to determine the relative importance of this effect in the adiabatic deformation of high-strength steels and its possible role in ballistic penetration.
Author (GRA)

N83-24819*# Los Alamos Scientific Lab., N. Mex.
LONG TITANIUM HEAT PIPES FOR HIGH-TEMPERATURE SPACE RADIATORS
S. P. Girrens and D. M. Ernst (Thermacore, Inc., Lancaster, Pa.) 1982 6 p refs Presented at the 17th Intersoc. Energy Conversion

Eng. Conf., Los Angeles, 8-13 Aug. 1982
(Contract W-7405-eng-36)
(DE82-014069; LA-UR-81-1054; CONF-820814-2) Avail: NTIS HC A02/MF A01

Titanium heat pipes are being developed to provide light weight, reliable heat rejection devices as an alternate radiator design for the Space Reactor Power System (SP-100). The radiator design includes 360 heat pipes, each of which is 5.2 m long and dissipates 3 kW of power at 775 K. The radiator heat pipes use potassium as the working fluid, have two screen arteries for fluid return, a roughened surface distributive wicking system, and a D shaped cross section container configuration. A prototype titanium heat pipe, 5.5 m long, was fabricated and tested in space simulating conditions. Results from startup and isothermal operation tests are presented. These results are also compared to theoretical performance predictions that were used to design the heat pipe initially. DOE

N83-24820# Sandia Labs., Albuquerque, N. Mex. Fluid Mechanics and Heat Transfer Div.
COYOTE: A FINITE-ELEMENT COMPUTER PROGRAM FOR NONLINEAR HEAT-CONDUCTION PROBLEMS
David K. Gartling Oct. 1983 133 p refs
(Contract DE-AC04-76DP-00789)
(DE83-003822; SAND-77-1332-Rev) Avail: NTIS HC A07/MF A01

A finite element computer program COYOTE was designed for the solution of two dimensional, nonlinear heat conduction problems. The theoretical and mathematical basis used to develop the code is described. Program capabilities and complete user instructions are presented. Several example problems are described in detail to demonstrate the use of the program. DOE

N83-24821# Oak Ridge National Lab., Tenn.
SIMULTANEOUS HEAT AND MASS TRANSFER IN ABSORPTION OF GASES IN LAMINAR LIQUID FILMS
Gershon Grossman Sep. 1982 74 p refs
(Contract W-7405-eng-26)
(DE82-021108; ORNL/TM-8366) Avail: NTIS HC A04/MF A01

A theoretical analysis of the combined heat and mass transfer process taking place in the absorption of a gas or vapor into a laminar liquid film is described. This type of process, which occurs in many gas-liquid systems, often releases only a small amount of heat, making the process almost isothermal. In some cases, however, thet heat of absorption is significant and temperature variations cannot be ignored. One example, is in absorption heat pumps where mass transfer is produced specifically to generate a temperature change. The model analyzed describes a liquid film that flows over an inclined plane and has its free surface in contact with stagnant vapor. The absorption process at the surface creates nonuniform temperature and concentration profiles in the film, which develop until equilibrium between the liquid and vapor is achieved. The energy and diffusion equations are solved simultaneously to give the temperature and concentration variations at the interface and the wall. DOE

N83-24822# Los Alamos Scientific Lab., N. Mex.
ARTERY HEAT PIPES FOR SPACE-POWER SYSTEMS
M. Merrigan, C. Prenger, H. E. Martinez, and J. Runyan 1982 7 p refs Presented at the 17th Intersoc. Energy Conversation Eng. Conf., Los Angeles, 8 Aug. 1982
(Contract W-7405-eng-36)
(DE82-015445; LA-UR-82-1270; CONF-820814-12) Avail: NTIS HC A02/MF A01

High temperature liquid metal heat pipes are developed as part of the SP-100 space power system. The operating temperature of the heat pipes is in the 1400 to 1500 K range and the design power level is 15 kW pipe. Baseline design for the heat pipes is an arterial configuration using a fine mesh screen for the arteries and distribution wick. Performance predictions for this configuration were conducted and the designs characterized as a function of artery geometry, distribution wick thickness, porosity, pore size, and permeability. In parallel with this effort the screen wick materials were characterized experimentally in terms of pore size and permeability. As a verification of the performance predictions a heat pipe employing two tubular arteries and a distribution wick of tightly compacted, 150 mesh molybdenum screen was assembled and operated with sodium as a working fluid. DOE

N83-24823# Oak Ridge National Lab., Tenn. Fuel Recycle Div.
EVALUATION OF A HEAT EXCHANGER FOR USE IN THE INTEGRATED EQUIPMENT TEST FACILITY SOLVENT-EXTRACTION SYSTEM
B. E. Lewis Dec. 1982 22 p refs
(Contract W-7405-eng-26)
(DE83-005174; ORNL/TM-8483) Avail: NTIS HC A02/MF A01

The primary decontamination extraction section product (HAP) heat exchanger will be located between the extracting section (HA) and scrubbing section (HS) of centrifugal solvent extraction contactors in the Integrated Equipment Test (IET) facility. The heat exchanger is required to raise the temperature of the organic product stream from the HA contactor from 40 to 500 C. Tests were conducted under prototypic IET operating conditions to determine the head requirements for gravity flow and the overall heat transfer coefficient for the heat exchanger. Results from the tests indicated that the specified heat exchanger would perform satisfactorily under normal operating conditions. DOE

N83-24824# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.
EXPERIMENTAL AND NUMERICAL STUDIES OF NATURAL CONVECTION IN A HELE-SHAW CELL
Christine E. Viney (Oklahoma Univ.), C. E. Hickox, and P. C. Montoya Dec. 1982 60 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005251; SAND-82-0435) Avail: NTIS HC A04/MF A01

The results of an experimental study are reported in which a Hele-Shaw cell was used to simulate natural convection flow in a homogeneous porous region subjected to a horizontal temperature gradients. Measured velocities and photographs of streamline patterns are compared with numerical predictions produced with the finite element computer program, MARIAH. Results of numerical simulations are also reported for Rayleigh-Benard convection in a bottom-heated, horizontal, porous layer. The numerical results are compared with the experimental Hele-Shaw cell results of Hartline and Lister. The comparison between these experimental and numerical studies provides some support for the qualification of MARIAH as a general prupose code for the description of natural convection in porous media at low Rayleigh numbers. DOE

N83-24825# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
HEAT- AND MASS-TRANSFER EFFECT IN SLURRY-BED FISCHER-TROPSCH REACTORS
H. Heinemann, A. T. Bell, and D. A. Stern Feb. 1982 19 p refs Presented at the Intern. Coal Conversion Conf. (CSIR), Pretoria, 16-20 Aug. 1982 Submitted for publication
(Contracts W-7405-eng-48; DE-AC03-76SF-00098)
(DE82-014980; LBL-13238-Rev; CONF-810818-1-Rev) Avail: NTIS HC A02/MF A01

One of the advantages claimed for slurry bed reactors is the ability to operate at lower hydrogen to carbon monoxide ratios than either the fixed bed or fluid bed. Reasons for this difference were not previously fully established. Two factors may contribute to the ability of the slurry reactor to tolerate lower hydrogen/CO ratios. These are greater isothermicity, and mass transfer effects on the gas liquid interface in the slurry reactor. Work with small diameter fixed bed reactors has shown that there is a critical temperature at which plugging of the reactors using an iron catalyst will occur. The exact temperature is a function of both the hydrogen/CO ratio and the space velocity. A difference of 10 to 15 C separates operability from non-operability. It is therefore likely that in the critical temperature range around 300 C hot spots on the catalysts may be the cause of plugging and deactivation at low hydrogen/CO ratios. DOE

N83-24826# Bhabha Atomic Research Centre, Bombay (India). Reactor Engineering Div.
COUPLED CONVECTIVE AND CONDUCTIVE HEAT TRANSFER BY UP-WIND FINITE ELEMENT METHOD
H. S. Kushwaha 1981 37 p refs
(DE82-904594; BARC-1118) Avail: NTIS HC A03/MF A01

Some of the concepts relating to finite element formulation of the Navier-Stoke's equations using mixed formulation and Penality formulation are discussed. The two different approaches for solution of nonlinear differential equations for two different types of formulation are discussed. The two different approaches for solution of nonlinear differential equations for two different types of formulation are described. Incremental Newton Raphson method can also be applied to mixed formulations. DOE

N83-24827# Oak Ridge National Lab., Tenn. Energy Div.
LABORATORY EVALUATION OF THE HEATING CAPACITY AND EFFICIENCY OF A HIGH-EFFICIENCY, AIR-TO-AIR HEAT PUMP WITH EMPHASIS ON FROSTING/DEFROSTING OPERATION
W. A. Miller Oct. 1982 100 p refs
(Contract W-7405-eng-26)
(DE83-005168; ORNL/CON-69) Avail: NTIS HC A05/MF A01

A high-efficiency, air-to-air split-system residential heat pump of nominal 3-ton capacity was instrumented and tested in the heating mode under laboratory conditions. Performance of the system was measured during steady-state, dehumidifying, and frosting-defrosting conditions, with major emphasis placed on the dynamic frosting operation of the system. The study encompassed an evaluation of system and component performance for ambient temperature levels between 8.3 and -8.3 C (47 and 17 F respectively) and for discrete humidity levels ranging from 50 to 90%. The heat pump coefficient of performance (COP) and capacity, measured at 4.4 C (40 F) as a function of time after system start-up, decreased with time because of frost accumulation on the outdoor heat exchanger but increased with increasing the COP and capacity degradations caused by frost formation increased with increasing relative humidity because of greater frost accumulation of the outdoor heat exchanger. Experimental results revealed that both unnecessary and late defrosting operations occur when a time-and-temperature defrosting control is used. Concepts of advanced defrosting controls that could feasibly reduce both frosting and defrosting losses were developed from experimental data. Frosting caused greater degradation of heating capacity than defrosting did. DOE

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources*. For related information see also *06 Aircraft Instrumentation*, and *19 Spacecraft Instrumentation*.

N83-24828* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
GAS LEVITATOR HAVING FIXED LEVITATION NODE FOR CONTAINERLESS PROCESSING Patent
Leroy H. Berge, William A. Oran, and M. Theiss, inventors (to NASA) Issued 28 Aug. 1981 7 p Filed 28 Aug. 1981 Supersedes N82-10359 (20 - 01, p 52)
(NASA-Case-MFS-25509-1; US-Patent-4,378,209; US-Patent-Appl-SN-297486; US-Patent-Class-432-58; US-Patent-Class-34-57A; US-Patent-Class-156-DIG.62; US-Patent-Class-432-227) Avail: US Patent and Trademark Office CSCL 14B

A method and apparatus is disclosed for levitating a specimen of material in a containerless environment at a stable nodal position independent of gravity. An elongated levitation tube has a contoured interior in the form of convergent section, constriction, and a divergent section in which the levitation node is created. A gas flow control means prevents separation of flow from the interior walls in the region of a specimen. The apparatus provides for levitating and heating the specimen simultaneously by combustion of a suitable gas mixture combined with an inert gas.
Official Gazette of the U.S. Patent and Trademark Office

N83-24829*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ANALYSIS OF STRAIN GAGE RELIABILITY IN F-100 JET ENGINE TESTING AT NASA LEWIS RESEARCH CENTER
Ray Holanda Mar. 1983 12 p refs (NASA-TM-83325)
Avail: NTIS HC A03/MF A01 CSCL 14B

A reliability analysis was performed on 64 strain gage systems mounted on the 3 rotor stages of the fan of a YF-100 engine. The strain gages were used in a 65 hour fan flutter research program which included about 5 hours of blade flutter. The analysis was part of a reliability improvement program. Eighty-four percent of the strain gages survived the test and performed satisfactorily. A post test analysis determined most failure causes. Five failures were caused by open circuits, three failed gages showed elevated circuit resistance, and one gage circuit was grounded. One failure was undetermined. Author

N83-24830*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LIQUID HELIUM MANAGEMENT FOR GRAVITY PROBE-B
Charles Schafer Dec. 1982 36 p refs
(NASA-TM-82521; NAS 1.15:82521) Avail: NTIS HC A03/MF A01 CSCL 14B

The Gravity Probe-B (GP-B) experiment will be degraded if accelerations at a proof mass become larger than one ten billionth g. This makes necessary the management of the configuration and dynamical behavior of the large amount of liquid helium present in the GP-B spacecraft dewar. Three approaches to the solution of this problem are discussed. It is concluded that the most promising technique involves the use of baffles into which the liquid helium can be forced during a relatively high spacecraft rotation period, and in which the liquid helium will be held by capillary forces during the operational period when the rotation rate is much lower. Some likely baffle configurations are suggested. S.L.

N83-24831# Rockwell International Corp., Golden, Colo. Energy Systems Group.
REMOTE CALIBRATION OF TORQUE WRENCHES IN A HOSTILE ENVIRONMENT
D. M. Griffin 22 Mar. 1982 6 p
(Contract DE-AC04-76DP-03533)
(RFP-3298) Avail: NTIS HC A02/MF A01

A relatively simple device is described which provides the capability for remote comparison of torque wrenches over a limited range. The device, properly used, provides calibration capability for most inch pound and foot pound range torque wrenches. For purposes of this discussion, the device itself was developed specifically for adapting an existing torque measuring system with torque wrenches in hostile environment. A gloved access port is utilized to manipulate the fixture while a viewing window and mirror are used to make visual comparisons. Click type wrenches do not require use of the mirror. Author

N83-24832# National Aerospace Lab., Tokyo (Japan).
DEVELOPMENT OF THE CHARGE AMPLIFIER FOR PIEZOELECTRIC ACCELEROMETER SENSORS
Takashi Koshinuma and Kenji Nishio 1983 19 p In JAPANESE; ENGLISH summary
(NAL-TR-749; ISSN-0389-4010) Avail: NTIS HC A02/MF A01

Piezoelectric accelerometer sensors which have many advantageous features are widely used in the field of vibration measurement. However, they usually require an amplifier to convert the small charge output to a stable voltage output. A newly developed charge amplifier employing hybrid technics for reducing

the weight and size and improving the reliability is described. These charge amplifiers had no failures during the time they were used in the Engine Monitoring System. Author

N83-24833*# Alabama Univ., Huntsville. Cosmic Ray and Nuclear Instrumentation Lab.
CALIBRATION OF THE ACTIVE RADIATION DETECTOR FOR SPACELAB-ONE Annual Report
Dec. 1982 19 p
(Contract NAS8-31170)
(NASA-CR-170752; NAS 1.26:170752) Avail: NTIS HC A02/MF A01 CSCL 14B

The flight models of the active radiation detector (ARD) for the ENV-01 environmental monitor were calibrated using gamma radiation. Measured sensitivities of the ion chambers were 6.1 + or - 0.3 micron rad per count for ARD S/N1, and 10.4 + or - 0.5 micron rad per count for ARD S/N2. Both were linear over the measured range 0.10 to 500 m/rad hour. The particle counters (proportional counters) were set to respond to approximately 85% of minimum ionizing particles of unit charge passing through them. These counters were also calibrated in the gamma field. Author

N83-24834# Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
UNDERSTANDING DIELECTRIC CURE MONITORING Technical Report, Jun. - Sep. 1982
Stephen D. Senturia 5 Oct. 1982 10 p
(Contract N00014-78-C-0591; NR Proj. 356-691)
(AD-A123507; TR-5) Avail: NTIS HC A02/MF A01 CSCL 20/3

An ideal process monitoring method is one which does not perturb the process, yet somehow provides complete documentation of what is going on. Like all ideals, it is rarely approached in practice, but nevertheless serves to guide the development of suitable methods. The monitoring of the cure of thermosets is a good example. The continuous transition from viscous liquid to rubbery gel to vitreous solid characteristic of thermosets produces such large changes in properties that almost any method of physical measurement can be expected to yield a useful result. In practice, however, techniques such as calorimetry, infrared spectroscopy, and dynamical mechanical measurements, all of which yield highly useful information, tend to be confined to carefully controlled laboratory situations because of the difficulties of in-situ use. For cure monitoring in the manufacturing environment, alternative techniques are needed. GRA

N83-24835# Naval Civil Engineering Lab., Port Hueneme, Calif.
TEST AND EVALUATION OF THE MAGNOGRAPH (TM) UNIT, A NONDESTRUCTIVE WIRE ROPE TESTER Final Report, Sep. 1980 - Sep. 1981
L. D. Underbakke and H. H. Haynes Jul. 1982 89 p
(AD-A124267; NCEL-TN-1639) Avail: NTIS HC A05/MF A01 CSCL 14/2

The nondestructive wire rope test device, a unitized AC/DC Magnograph, was tested for operational characteristics prior to acquisition by Naval field activities and start of inspection programs. The Magnograph was tested for loss of metallic area (LMA) and local fault (LF) detection accuracy. Wire ropes 1/2, 3/4, 1-1/8, 1-1/2, 2, and 2-1/2 inches in diameter were tested on a wire rope test track to find the accuracy of the unit. Two mining wire ropes, guy wires of a 1,000-ft-tall tower, and wire rope for 400-, 250-, and 30-ton cranes were used to determine operational characteristics of the Magnograph. GRA

N83-24836# Naval Academy, Annapolis, Md. Dept. of Physics.
CAPACITIVE PRESSURE TRANSDUCERS AND PRESSURE FIXED POINTS Final Report, 1981 - 1982
Frank P. Pursel 29 Jul. 1982 59 p refs
(AD-A124254; USNA-TSPR-118) Avail: NTIS HC A04/MF A01

The audio frequency electrical properties of lead fluoride were studied in order to investigate its possible use in the construction of a capacitive pressure transducer. Lead fluoride was doped with strontium fluoride in an attempt to create a material desirable for such a device. A material of the desired properties was approached by increasing the concentration of strontium dopant. However, the crystals with dopants at the desired concentration were not grown easily and effort in this area was curtailed in order to pursue the definition of fixed points for lead fluoride at various doped concentrations. Author

N83-24837# Arizona Univ., Tucson. Dept. of Chemistry.
MINIATURIZED MULTISENSOR PROBES BASED ON COATED WIRE ION SELECTIVE ELECTRODES Final Technical Report, 1 Oct. 1977 - 30 Jun. 1981
Henry Freiser 11 Jan. 1983 12 p refs
(Contract N00014-78-C-0001; NR Proj. 051-672)
(AD-A123415; TR-1) Avail: NTIS HC A02/MF A01 CSCL 09/1

Research concerned with the development of selective, sensitive, and rugged methods of analysis for organic species in sea water and general oceanographic environments as well as those that are associated with CW agents, that would be capable of application in general field use has been carried out. A two-pronged attack involving (a) multi-sensor ion probes based on coated wire electrode technology and (b) a newly developed liquid chromatographic technique for neutral species has been employed. Author (GRA)

N83-24838# Oak Ridge National Lab., Tenn.
TEMPERATURE STANDARDS, WHAT AND WHERE: RESOURCES FOR EFFECTIVE TEMPERATURE MEASUREMENTS
Wiley W. Johnston, Jr. 1982 17 p Presented at the 6th Symp. on Temp., Washington, 14 Mar. 1982
(Contract W-7405-eng-26)
(DE82-009619; CONF-820306-8) Avail: NTIS HC A02/MF A01

Many standards were published to describe devices, methods, and other topics. How they are developed and by whom are briefly described, and an attempt is made to extract most of those relating to temperature measurements. A directory of temperature standards and their sources is provided. DOE

N83-24839# Sandia Labs., Albuquerque, N. Mex.
THE SANDIA NUCLEAR MICROPROBE
Barney L. Doyle and Norman D. Wing Nov. 1982 33 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005363; SAND-82-2393) Avail: NTIS HC A03/MF A01

A nuclear microprobe analysis system attached to Sandia's EN tandem Van de Graaff accelerator is described. A magnetic quadrupole doublet lens is used for the final focus and 2-(SIGMA)m beam diameters have been obtained. Several illustrative applications of the microprobe, including the first three dimensional concentration profiles using Rutherford backscattering and elastic recoil detection ever measured, are given. DOE

N83-24840# Rockwell International Corp., Golden, Colo. Energy Systems Group.
AN AUTOMATIC TEMPERATURE-CALIBRATION SYSTEM
Robert L. Thompson and Robert S. Stant 23 Aug. 1982 44 p
(Contract DE-AC04-76DP-03533)
(DE82-021953; RFP-3279) Avail: NTIS HC A03/MF A01

A relatively inexpensive, computer-controlled temperature calibration system is described. The system provides working standard level calibration between -90 C and +1100 C for multiple resistance thermometers or thermocouples. It is designed to collect the data in a cooldown or ballistic state using either a platinum resistance thermometer or a precision thermocouple as a standard. The use of this calibration system increases measurement repeatability, while greatly reducing the man-hours required for a calibration. Construction and basic software details of the temperature calibration system are provided. DOE

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-24841# Mound Lab., Miamisburg, Ohio.
REPRODUCIBILITY OF AN AUTOMATED LASER RAMAN

SYSTEM FOR LIGHT GAS ANALYSIS
Paula A. Spangler and Carl J. Seliskar 27 May 1982 16 p refs (Contract DE-AC04-76DP-00053)
(MLM-2804) Avail: NTIS HC A02/MF A01

The experimental design, method of data collection, and subsequent analysis of an experimental laser Raman system are described. Results describe the feasibility of application of this system for light gas analysis. It is shown that the 1-sigma standard deviation reproducibilities of 0.03% can be obtained for major isotopic components (97%) and 0.9% reproducibility for a 12.3% component. Gases present at 0.49% can be analyzed with better than 4% reproducibility. Author

N83-24842*# National Aeronautics and Space Administration. Pasadena Office, Calif.
DIGITAL CONTROL OF DIODE LASER FOR ATMOSPHERIC SPECTROSCOPY Patent Application
Robert T. Menzies (JPL, California Inst. of Tech., Pasadena) and Charles W. Rutledge, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 3 Jun. 1982 21 p Sponsored by NASA (NASA-Case-NPO-16000-1; US-Patent-Appl-SN-384547) Avail: NTIS HC A02/MF A01 CSCL 20E

The absorption spectra of trace species can be remotely determined using a diode laser tunable over a useful spectral region of 50/cm to 200/cm by control of diode laser temperature over range from 15 K to 100 K, and tunable over a smaller region of typically 0.1/cm to 10/cm by control of the diode laser current over a range from 0 to 2 amps. Diode laser temperature and current set points are transmitted to the instrument in digital form and stored in memory for retrieval under control of a microprocessor during measurements. The laser diode current is determined by a digital-to-analog converter through a field-effect transistor for a high degree of ambient temperature stability, while the laser diode temperature is determined by set points entered into a digital-to-analog converter under control of the microprocessor. Temperature of the laser diode is sensed by a sensor diode to provide negative feedback to the temperature control circuit that responds to the temperature control digital-to-analog converter. NASA

N83-24843# Northrop Research and Technology Center, Palos Verdes Peninsula, Calif. Laser Technology Lab.
EFFICIENT RAMAN CONVERSION OF XeC1 LASER INTO THE BLUE-GREEN REGION Final Report
Hiroshi Komine and Eddy A. Stappaerts Nov. 1982 57 p refs (Contract N00014-81-C-0293)
(AD-A124193; NRTC-82-24R) Avail: NTIS HC A04/MF A01 CSCL 20/5

An efficient, blue-green laser source is urgently needed for the Navy submarine communication system as well as other applications. The rare gas halide excimer lasers developed over the last few years appear to meet the requirements on efficiency and scalability, but the wavelength of their near uv emission is too short for direct use. This report describes theoretical and experimental work on the feasibility of a novel, frequency conversion scheme, based on higher order Raman scattering, for efficiently shifting the UV wavelengths of these excimer lasers to the blue-green region. The technique uses an oscillator amplifier combination, and the Raman medium is typically a gas such as hydrogen or deuterium at a pressure of several atmospheres. In preliminary experiments with a frequency tripled Nd:YAG laser (355 nm), photon efficiencies as high as 51% have been obtained for the second Stokes order, in very good agreement with computer simulations. More recently, the Raman oscillator amplifier experiments have been extended to the case of an XeC1 pump laser. The Raman amplifier experiments led to the observation of significant conversion from 308 nm to 499 nm by third Stokes order shifting for the first time. GRA

N83-24844# Naval Research Lab., Washington, D. C. Plasma Physics Div.
NONUNIFORMITIES IN LASER-ABLATED PLASMA
M. J. Herbst, J. A. Stamper, R. H. Lehmberg, R. R. Whitlock, F. C. Young, J. Grun (Mission Research Corp.), and B. H. Ripin 30 Dec. 1982 13 p refs Presented at the First Topical Conf. on Symmetry Aspects of Inertial Fusion Implosions, Washington, 27-28 May 1981
(Contract DE-AI08-79DP-40092)
(AD-A123643; NRL-MR-4983) Avail: NTIS HC A02/MF A01 CSCL 20/5

With long pulse-duration (4 nsec), moderate intensity (approximately 10 to 13th power W/cm squared) Nd-laser illumination of planar targets, evidence is found in images of X-ray, 3/2 omega 0 and 2 omega 0 emission for filamentation of the incident beam. Calculations indicate that this may be due to thermal self-focusing of hot spots in the laser. X-ray images show spots and spicules, jets of material flow which appear to follow the fluid flow from the target. These may be attributed to the presence of microscopic impurities on our laser-irradiated foil targets. Author (GRA)

N83-24845# Maryland Univ., College Park. Inst. of Technology.
INVESTIGATION OF COLD CATHODE AND RF EXCITATION FOR LONG LIFE CO2 WAVEGUIDE LASERS Annual Summary Report
U. Hochuli Dec. 1982 25 p
(Contract N00014-79-C-0312; Grant AF-AFOSR-0058-82)
(AD-A123178) Avail: NTIS HC A02/MF A01 CSCL 20/5

This report describes a Ag-Li compound cathode for the longitudinally d.c. excited, low power, CO2 waveguide laser. Discharge tube results with this cathode produced an acceptable gas composition over a period of 10,000 hours. The sputtering rate was quite low and, most importantly, the sputtering products did adhere quite well in the form of a thin film on the closet, cooler surfaces. GRA

N83-24846# IBM Research Lab., San Jose, Calif. Dept. K46.
READING AND WRITING OF PHOTOCHEMICAL HOLES USING GaAlAs DIODE LASERS
P. Pokrowsky (GKSS-Forschungszentrum Geesthacht), W. E. Moerner, F. Chu, and G. C. Bjorklund 7 Feb. 1983 18 p refs Submitted for publication
(Contract N00014-81-C-0165; NR Proj. 421-001)
(AD-A124633; TR-5) Avail: NTIS HC A02/MF A01 CSCL 07/5

A current tuned (gallium aluminum arsenide) diode laser is utilized both to burn and to detect narrow photochemical holes in the inhomogeneously broadened 833 nm zero phonon line of the R' color center in LiF. Applications for reading and writing data into frequency domain optical memories based on photochemical hole burning are discussed. Author (GRA)

N83-24847# KMS Fusion, Inc., Ann Arbor, Mich.
INCREASING THE EFFECTIVE BANDWIDTH OF A LASER-FUSION DRIVER
George E. Busch 1981 18 p Presented at the Conf. on Lasers and Electro-Opt., Washington, 10 Jun. 1981
(Contract DE-AC08-78DP-40030)
(DE82-015170; KMSF-U-1088; CONF-810613-12) Avail: NTIS HC A02/MF A01

The absorption of narrow band 1.06 micron radiation by laser fusion targets was less than predicted by classical physics. Thus, early extrapolations of neutron yields and fuel densities that are achieved as more powerful lasers come on line were not fully realized. However, experiments are encouraging in that they show agreement with theoretical predictions that laser/target interactions should improve at shorter laser wavelengths. More recently theoretical treatments have further suggested that energy absorption may improve if the laser bandwidth can be increased to several percent of the laser frequency. Preliminary experiments using a plasma filter to broaden the bandwidth tend to support these predictions, but the results are not yet conclusive. DOE

N83-24848# Northrop Nortronics, Palos Verdes Peninsula, Calif.
EFFICIENT KrF-LASER PULSE COMPRESSION Final Report
E. A. Stappaerts 30 Apr. 1982 76 p refs
(Contract DE-AC08-78DP-40045)
(DE82-021926; DOE/DP-40045/1) Avail: NTIS HC A05/MF A01

The results of theoretical and experimental studies performed

on pulse compression techniques for advanced ICF drivers are described. The first objective of this program was a detailed theoretical study of a pulse compression technique. The basis of the new technique is the use of linearly expanding beams as opposed to collimated beams in backward Raman pulse compressors. The expectation was that this new geometry would considerably enhance the compressor performance, especially with respect to the buildup of second Stokes parasitics. Detailed analysis and extensive computer simulations carried out as part of this program have shown, however, that the advantages are not as pronounced as expected, especially with respect to parasitic suppression. DOE

N83-24849# California Univ., Livermore. Lawrence Livermore Lab.

ARGUS DISK-TARGET EXPERIMENTS AT 1.06 MICROMETER, 0.53 MICROMETER AND 0.35 MICROMETER

R. E. Turner, E. M. Campbell, W. C. Mead, F. Ze, C. Max, D. W. Phillion, P. Lee, B. Pruett, G. Tirsell, and B. F. Lasinski 1982 21 p refs Presented at the CLEO '82 Conf., Phoenix, Ariz., 14-16 Apr. 1982

(Contract W-7405-eng-48)

(DE82-020169; UCRL-86893; CONF-820435-2) Avail: NTIS HC A02/MF A01

ARGUS wavelength scaling experiments on disk targets at 1.06 microns, 0.53 microns and 0.35 microns are reported on. Measurements were made of absorption, stimulated Brillouin and Raman scattering, and 3/2 harmonic light. DOE

N83-24850# California Univ., Livermore. Lawrence Livermore Lab.

OPTICAL COMPONENTS FOR THE NOVA LASER

E. P. Wallerstein, P. C. Baker, N. J. Brown, J. B. Bryan, W. H. Lowdermilk, F. T. Marchi, L. G. Seppala, S. E. Stokowski, J. B. Willis, W. T. Whistler et al 17 May 1982 15 p Presented at the 9th Symp. on Eng. Probl. of Fusion Res., Chicago, 26 Oct. 1982

(Contract W-7405-eng-48)

(DE82-017294; UCRL-86013-Rev-1; CONF-821016-1) Avail: NTIS HC A02/MF A01

The Nova Laser Fusion facility may well be the largest precision optical project ever undertaken. Moreover, during the course of construction, concurrent research and development has been successfully conducted, and has resulted in significant advances in various technical areas, including manufacturing efficiency. Although assembly of the first two beams of Nova is just commencing, the optical production, including construction of the special facilities required for many of the components, has been underway for over three years, and many phases of the optical manufacturing program for the first 10 beams will be completed within the next two years. On the other hand, new requirements for second and third harmonic generation have created the need to initiate new research and development. This work has been accomplished through the enormous cooperation DOE/LLNL has received from commercial industry on this project. DOE

N83-24851# Los Alamos Scientific Lab., N. Mex.

BONDED STACKED-RING INSULATOR FOR THE ANTARES ELECTRON GUN

R. D. Stine, G. R. Allen, E. Eton, and B. Weinstein 1982 10 p refs Presented at the Conf. on Elec. Insulation and Dielec. Phenomena, Amherst, Mass., 17 Oct. 1982

(Contract W-7405-eng-36)

(DE82-017586; LA-UR-82-1867; CONF-821013-2) Avail: NTIS HC A02/MF A01

A large diameter insulator utilizing epoxy bonding which has sufficient mechanical strength to support the 3000 kg cathode/grid assembly was developed. Bonding the insulator simplifies the handling and reduces the number of O ring seals to a minimum. The material selection, bonding techniques and electrical design approach are described. DOE

N83-24852# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.

OPTICAL PUMPING OF HOT PHONONS IN GaAs

Charles L. Collins and P. Y. Yu 30 Jun. 1982 4 p refs Presented at the 16th Intern. Conf. on the Phys. of Semiconductors, Montpellier, France, 6 Sep. 1982

(Contract DE-AC03-76SF-00098)

(DE82-020519; LBL-14067; CONF-820937-3) Avail: NTIS HC A02/MF A01

The optical pumping of hot LO phonons in GaAs was studied as a function of the excitation photon frequency. The experimental results are in good agreement with a model calculation which includes both inter- and intra-valley electron-phonon scatterings. The Gamma-L and Gamma-X intervalley electron-phonon interactions in GaAs were estimated. DOE

N83-24853# Los Alamos Scientific Lab., N. Mex.

CALCULATION OF THREE-DIMENSIONAL DISTRIBUTIONS OF CURRENT DENSITY, ELECTRIC FIELD AND POWER DEPOSITION IN EXTERNALLY SUSTAINED ELECTRICAL DISCHARGES

Wallace T. Leland and Mary Kircher 1982 42 p refs Presented at the 1982 IEEE Intern. Conf. on Plasma Sci., Ottawa, 17-19 May 1982

(Contract W-7405-eng-36)

(DE82-021880; LA-UR-82-2374; CONF-820517-2) Avail: NTIS HC A03/MF A01

In the design of larger and larger CO2 laser amplifiers, the problem of attaining the ideal uniform discharge in these large discharge volumes becomes increasingly difficult and expensive to solve. The practical solution is a compromise between uniformity and other design considerations. In order to judge the adequacy of each compromise, a method of predicting the distribution of current density and electric field throughout the discharge volume is needed. When these electrical distributions are known, population inversions can be calculated and the amplifier performance evaluated. A method of calculating the three-dimensional distributions of electric field and current density for externally sustained discharges is described. DOE

N83-24854# California Univ., Livermore. Lawrence Livermore Lab.

OXIDE AND HALIDE LASER GLASSES

M. J. Weber 30 Jul. 1982 31 p refs Presented at the 2nd Intern. Otto Schott Colloq., Jena, East Germany, 12-16 Jul. 1982 Submitted for publication

(Contract W-7405-eng-48)

(DE82-020162; UCRL-87964; CONF-820743-1) Avail: NTIS HC A03/MF A01

Optical and spectroscopic properties of oxide and halide glasses are compared for optically-pumped laser applications. Properties considered include the transparency, linear and nonlinear refractive indices, and damage threshold of the host glass and the absorption spectrum, radiative and nonradiative transition probabilities, fluorescence wavelength, stimulated emission cross sections, and spectroscopic inhomogeneities of the lasing ion. Most of these properties exhibit systematic variations with glass composition which can be used to tailor laser parameters. Measured properties for the (4)F sub(3/2) yields (4)I sub (11/2) lasing transition of Nd(3+) are surveyed for oxide (silicate, phosphate, borate, germanate, tellurite), halide (fluoroberyllate, fluoroaluminate, fluorozirconate, fluorohafnate, chloride), and oxyhalide (fluorophosphate, chlorophosphate) glasses. DOE

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-24855*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

OPTIMUM PARALLEL STEP-SECTOR BEARING LUBRICATED WITH AN INCOMPRESSIBLE FLUID

Bernard J. Hamrock Apr. 1983 7 p refs
(NASA-TM-83356; E-1616; NAS 1.15:83356) Avail: NTIS HC A02/MF A01 CSCL 11H

The dimensionless parameters normally associated with a step sector thrust bearing are the film thickness ratio, the dimensionless step location, the number of sectors, the radius ratio, and the angular extent of the lubrication feed groove. The optimum number of sectors and the parallel step configuration for a step sector thrust bearing while considering load capacity or stiffness and assuming an incompressible fluid are presented. Author

N83-24856*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CAVITATION EROSION OF COPPER, BRASS, ALUMINUM AND TITANIUM ALLOYS IN MINERAL OIL
B. C. S. Rao (National Academy Science - National Research Council, Washington, D.C.) and D. H. Buckley 1983 12 p refs Proposed for presentation at 6th Intern. Conf. on Erosion by Liquid and Solid Impact, 4-8 Sep. 1983; sponsored by Cavendish Lab., Cambridge, England
(NASA-TM-83402; E-1614; NAS 1.15:83402) Avail: NTIS HC A02/MF A01 CSCL 11F

The variations of the mean depth of penetration, the mean depth rate of penetration, MDRP, the pit diameter 2a and depth h due to cavitation attack on Al 6061-T6, Cu, brass of composition Cu-35Zn-3Pb and Ti-5Al-2.5Sn are presented. The experiments are conducted in a mineral oil of viscosity 110 CS using a magnetostrictive oscillator of 20 kHz frequency. Based on MDRP on the materials, it is found that Ti-5Al-2.5Sn exhibits cavitation erosion resistance which is two orders of magnitude higher than the other three materials. The values of h/a are the largest for copper and decreased with brass, titanium, and aluminum. Scanning electron microscope studies show that extensive slip and cross slip occurred on the surface prior to pitting and erosion. Twinning is also observed on copper and brass. Author

N83-24857*# Michigan Univ., Ann Arbor.
CLASSIFICATION OF JOURNAL SURFACES USING SURFACE TOPOGRAPHY PARAMETERS AND SOFTWARE METHODS TO COMPENSATE FOR STYLUS GEOMETRY Interim Report
Cheng-Jih Li, Warren R. DeVries, and Kenneth C. Ludema Apr. 1983 54 p refs
(Contracts NCC3-11; DE-AI01-80CS-50194)
(NASA-CR-168153; DOE/NASA/0011-1; NAS 1.26:168153) Avail: NTIS HC A04/MF A01 CSCL 09B

Measurements made with a stylus surface tracer which provides a digitized representation of a surface profile are discussed. Parameters are defined to characterize the height (e.g., RMS roughness, skewness, and kurtosis) and length (e.g., autocorrelation) of the surface topography. These are applied to the characterization of crank shaft journals which were manufactured by different grinding and lopping procedures known to give significant differences in crank shaft bearing life. It was found that three parameters (RMS roughness, skewness, and kurtosis) are necessary to adequately distinguish the character of these surfaces. Every surface specimen has a set of values for these three parameters. They can be regarded as a set coordinate in a space constituted by three characteristics axes. The various journal surfaces can be classified along with the determination of a proper wavelength cutoff (0.25 mm) by using a method of separated subspace. The finite radius of the stylus used for profile tracing gives an inherent measurement error as it passes over the fine structure of the surface. A mathematical model is derived to compensate for this error. S.L.

N83-24858*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
NASA TRANSMISSION RESEARCH AND ITS PROBABLE EFFECTS ON HELICOPTER TRANSMISSION DESIGN
Erwin V. Zaretsky, John J. Coy (Army Research and Technology Labs., Cleveland, Ohio), and Dennis P. Townsend 1983 20 p refs Presented at the 39th Ann. Forum of the Am. Helicopter Soc., St. Louis, 9-11 May 1983
(NASA-TM-83389; E-1601; NAS 1.15:83389; AVRADCOM-TR-83-C-3) Avail: NTIS HC A02/MF A01 CSCL 01/3

Transmissions studied for application to helicopters in addition to the more conventional geared transmissions include hybrid (traction/gear), bearingless planetary, and split torque transmissions. Research is being performed to establish the validity of analysis and computer codes developed to predict the performance, efficiency, life, and reliability of these transmissions. Results of this research should provide the transmission designer with analytical tools to design for minimum weight and noise with maximum life and efficiency. In addition, the advantages and limitations of drive systems as well as the more conventional systems will be defined. S.L.

N83-24859# Cambridge Univ. (England). Dept. of Engineering.
THE ACTUATOR DUCT REPRESENTATION OF TURBOMACHINERY BLADE ROWS
W. R. Hawthorne 1983 14 p refs
(CUED/A-Turbo/TR-119; ISSN-0309-6521) Avail: NTIS HC A02/MF A01

The theory of the actuator for representing turbomachinery blade rows is developed starting from the actuator disk to include the effects of inlet shear and skew and the effects of compressibility. Author

N83-24860# National Aerospace Lab., Tokyo (Japan).
SEAL PERFORMANCE AND DURABILITY OF ROTATING SHAFT SEALS OF LIQUID OXYGEN TURBOPUMP
Mineo Suzuki, Kenjiro Kamljo, Yoshiaki Watanable, and Masahiro Mori 1982 31 p refs In JAPANESE; ENGLISH summary
(NAL-TR-717; ISSN-0389-4010) Avail: NTIS HC A03/MF A01

The LOX turbopump rotating shaft seals were studied in connection with the research and development of the LOX turbopump. The seal performance and durability of the rotating shaft seals of the LOX turbopump are described. The shaft seal system of the LOX turbopump consists of a liquid oxygen seal (a face contact metal bellows mechanical seal), a turbine drive hot gas seal (a segmented hydrodynamic circumferential seal), and a helium purge gas seal (a double segmented hydrodynamic circumferential seal). The operating conditions are as follows; rotating speed is 16,500 rpm, and sealed fluid pressures and temperatures are 15 ata and 90 K for the mechanical seal, 3 ata and 700 K for the turbine drive hot gas seal, and 3 ata and ambient for the helium purge gas seal respectively. The performance of the LOX turbopump shaft seal system was satisfactory in a series of LOX turbopump and LOX/LH2 turbopump system tests. The wear amount of the seals after total test time of about 2,000 sec. was acceptable. S.L.

N83-24861# National Aerospace Lab., Tokyo (Japan).
STUDY ON SEALING CHARACTERISTICS OF HIGH SPEED, FACE-CONTACT BELLOWS MECHANICAL SEALS FOR LIQUID HYDROGEN
Masataka Nosaka, Kenjiro Kamijo, Mineo Suzuki, Masataka Kikuchi, and Yukio Miyakawa 1982 78 p refs In JAPANESE; ENGLISH summary
(NAL-TR-750; ISSN-0389-0010) Avail: NTIS HC A05/MF A01

A high speed, face contact bellows mechanical seal for a liquid hydrogen turbopump of a liquid oxygen (LOX) and liquid hydrogen (LH2) rocket engine was developed. The results of experimental and analytical studies on the static and dynamic sealing performance and the wear process of a developed mechanical seal for an LH2 turbopump is described. The starting torque and static sealing performance were markedly affected by the change of the stationary seal face distortion, which was caused by fluid pressure and temperature, due to wear. The seal friction loss power fell by a small value after the mechanical seal faces had completely run-in. The sealing balance ratio of the mechanical seal, which stabilized the dynamic sealing at high rotative speed, was above 0.77. This high value was due to the large amount of the opening force. S.L.

N83-24862*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
REGRESSION ANALYSIS OF TRACTION CHARACTERISTICS OF TRACTION FLUIDS
Stuart H. Loewenthal and Douglas A. Rohn May 1983 17 p refs
(NASA-TP-2154; E-1300; NAS 1.60:2154) Avail: NTIS HC A02/MF A01 CSCL 11H

Traction data for Santotrac 50 and TDF-88 over a wide range of operating conditions were analyzed. An eight term correlation equation to predict the maximum traction coefficient and a six term correlation equation to predict the initial slope of the traction curve were developed. The slope correlation was corrected for size effect considering the compliance of the disks. The effects of different operating conditions on the traction performance of each traction fluid were studied. Both fluids exhibited a loss in traction with increases in spin, but the losses with the TDF-88 fluid were not as severe as those with Santotrac 50. Overall, both fluids exhibited similar performance, showing an increase in traction with contact pressure up to about 2.0 GPa, and a reduction in traction with higher surface speeds up to about 100 m/sec. The apparent stiffness of the traction contact, that is, film disk combination, increases with contact pressure and decreases with speed. A.R.H.

N83-24863# Dartmouth Coll., Hanover, N.H. School of Engineering.
FACTORS INFLUENCING THERMOMECHANICAL FAILURE OF FACE SEALS, 2 Interim Report, 1 Dec. 1981 - 30 Nov. 1982
Francis E. Kennedy, Jr., John N. Grim, and Roger P. Glovsky Jan. 1983 80 p refs
(Contract N00014-81-K-0090)
(AD-A124189; IR-2) Avail: NTIS HC A05/MF A01 CSCL 11/1

Analytical and experimental studies of factors affecting thermocracking and other modes of thermomechanical failure of mechanical face seals have continued for a second year. A unique contact probe/thermocouple has been built for studying characteristics of small patches of solid-to-solid contact at the sealing interface of mechanical face seals during seal operation. The probe was used to determine the number, size, location, and surface temperature of contact patches over a range of seal velocities. Both dry and liquid-lubricated conditions were studied, and three different mating ring materials were tested. It was found that small, discrete contact patches are indeed present on the contact interface, that the patches tend to be stationary with respect to the metallic mating ring, whether that ring is stationary or rotating, and that the size and temperature of the contact spots is influenced by operating velocity and by the thermal, elastic, and wear properties of the seal materials. The analytical phase of the study was focused on the prediction of surface temperatures at the patches of contact on the seal interface. GRA

N83-24864# Naval Air Engineering Center, Lakehurst, N.J. Ground Support Equipment Dept.
WEAR DEBRIS ANALYSIS OF GREASE-LUBRICATED SPUR GEAR Final Report
D. A. Jones 30 Dec. 1982 25 p
(WF53537401)
(AD-A123405; NAEC-92-164) Avail: NTIS HC A02/MF A01 CSCL 13/9

This report documents a study of the wear debris characteristics of grease-lubricated spur gears. Gear sets were operated in an attempt to correlate the wear state of gears with the wear debris found in the grease. A firm correlation between the two could not be accomplished due primarily to the inability to obtain clear ferrograms from the grease medium. GRA

N83-24865# Du Pont de Nemours (E. I.) and Co., Aiken, S.C. Savannah River Lab.
WELDING IRIDIUM HEAT-SOURCE CAPSULES FOR SPACE MISSIONS
W. R. Kanne, Jr. Mar. 1982 20 p refs Presented at the 63rd Ann. Meeting of the Am. Welding Soc., Kansas City, Mo., 26-30 Apr. 1982
(Contract DE-AC09-76SR-00001)
(DE82-020098; DPSPU-81-30-18; CONF-820449-2) Avail: NTIS HC A02/MF A01

A remote computer controlled welding station was developed to encapsulate radioactive PuO_2 in iridium. Weld quench cracking caused an interruption in production of capsules for upcoming space missions. Hot crack sensitivity of the DOP-26 iridium alloy was associated with low melting constituents in the grain boundaries. The extent of cracking was reduced but could not be eliminated by changes to the welding operation. An ultrasonic test was developed to detect underbead cracks exceeding a threshold size. Production was continued using the ultrasonic test to reject capsules with detectable cracks. DOE

N83-24866# Sandia Labs., Albuquerque, N. Mex. Geothermal Technology Development Div.
DESIGN OF A DIESEL EXHAUST-GAS PURIFICATION SYSTEM FOR INERT-GAS DRILLING
Billy C. Caskey 1982 4 p Presented at the Ann. Geothermal Resources Council Meeting, San Diego, Calif. 11 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE82-017071; SAND-82-1404C; CONF-821007-3) Avail: NTIS HC A02/MF A01

To combat the serious oxygen corrosion of drill pipe when a low density drilling fluid (air or mist) is used in geothermal drilling, a system was designed that produces an inert gas (essentially nitrogen) to be substituted for air. The system fits on three flatbed trailers, is roadable and produces 2000 scfm of gas. DOE

N83-24867# California Univ., Livermore. Lawrence Livermore Lab.
IMPROVED DESIGN FOR DYNAMICALLY-LOADED, THREADED INTERFACES
Michael J. Murphy 16 Apr. 1982 26 p refs Presented at the Conf. on Advances and Trends in Structural and Solid Mech., Washington, 4 Oct. 1982
(Contract W-7405-eng-48)
(DE82-012701; UCRL-86739; CONF-821003-1) Avail: NTIS HC A03/MF A01

An improved thread design for dynamically loaded, threaded interfaces is presented. Maximum stress is generally located in the thread relief region or the root of the first thread of a threaded interface under load. Consequently, a nonuniform stress distribution exists throughout the thread. The improved thread design provides for an alternate load path resulting in a uniform stress distribution and elimination of the thread root and relief stress concentration. Whitworth and ACME type threads have been examined using hydrodynamic finite element analysis techniques. Correlation with experimental results is good. The new thread design was successfully implemented in the high explosive velocity augmented kinetic energy penetrator. DOE

N83-24868# Imperial Coll. of Science and Technology, London (England). Fluids Section.
CALCULATIONS AND MEASUREMENTS OF THE FLOW IN A MOTORED MODEL ENGINE AND IMPLICATIONS FOR OPEN-CHAMBER DIRECT-INJECTION ENGINES
B. Ahmadi-Befrui, C. Arcoumanis, A. F. Bicen, A. D. Gosman, A. Jahanbakhsh, and J. H. Whitelaw Oct. 1981 37 p refs Presented at the AIAA/ASME Joint Conf. on Fluids, Plasma, Thermophys. and Heat Transfer, St. Louis, 7 Jun. 1982
(DE83-019033; CONF-820604-12) Avail: NTIS HC A03/MF A01

The velocity characteristics of the flow in an axisymmetric, four stroke model engine were calculated and measured. The calculations are performed with the rpm multidimensional prediction method, which solves the governing equations in a flexible curvilinear coordinate frame with turbulence effects represented by a two equation turbulence model. The results are compared with measurements obtained by laser-Doppler anemometry in a plexiglass cylinder with a flat piston, centrally located valve with 60 deg angle and nonswirling inlet flow, operating at 200 rpm and a compression ratio of 3.5. Moderate overall agreement is obtained

between data and predictions, which collectively show that a strong highly turbulent twin vortex structure is produced during induction, but commences to decay rapidly around inlet velve closure. The mean motion continues to fall to a low level during compression, but the turbulence intensity attains an approximate constant level of about 0.6 times the mean piston speed, as also observed in other engine configurations. It is concluded that this decay process is one of the motivations for inducing longer lived swirl motions in direct injection engines. DOE

N83-24883*# European Space Agency, Noordwikj (Netherlands).
CONSIDERATIONS ON THE LUBRICATION OF SPACECRAFT MECHANISMS
Mervyn Briscoe and Mike J. Todd (UKAEA) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 19-38 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24884*# Contraves Corp., Zurich (Switzerland). Dept. EKR.
SPACE TELESCOPE: SOLAR ARRAY PRIMARY DEPLOYMENT MECHANISM
Donald P. Chandler and Adolph Veit *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 39-54 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24885*# Schaeffer Magnetics, Inc., Chatsworth, Calif.
A BROADBASED ACTUATOR CONCEPT FOR SPACEFLIGHT APPLICATION
James C. Hammond *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 55-80 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24891*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SECURING MECHANISM FOR THE DEPLOYABLE COLUMN OF THE HOOP/COLUMN ANTENNA
Elvin L. Ahl, Jr. *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 157-170 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24894*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
TWO HUNDRED PASSAGE THREE-WAY VALVE: FRACTION COLLECTOR
Jay L. Keffer *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 199-208 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13K

N83-24896*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRACTICAL SMALL-SCALE EXPLOSIVE SEAM WELDING
Laurence J. Bement *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 227-244 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20K

N83-24898*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LATCH FITTINGS FOR THE SCIENTIFIC INSTRUMENTS ON THE SPACE TELESCOPE
Jan D. Dozier and Everett Kaelber (Perkin-Elmer) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 253-265 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24901*# Saab-Space A.B., Linkoeping (Sweden).
DEPLOYMENT AND RELEASE MECHANISMS ON THE SWEDISH SATELLITE, VIKING
Stefan Eriksson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 305-314 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20K

N83-24902*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Guidance and Control Sect.
DESIGN OF THE GALILEO REMOTE SCIENCE POINTING ACTUATORS
Fredrick W. Osborn *In its* The 17th Aerospace Mech. Symp. May 1983 p 315-332 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24903*# Mitsubishi Electric Mfg. Co. Ltd., Amagasaki (Japan).
A COMPACT MAGNETIC BEARING FOR GIMBALLED MOMENTUM WHEEL
K. Yabu-uchi, M. Inoue, S. Akishita, C. Murakami (National Aerospace Lab.), and O. Okamoto (National Aerospace Lab.) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 333-342 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24904*# Ball Aerospace Systems Div., Boulder, Colo.
HINGE LATCH MECHANISM
John C. Walker *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 343-356 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

N83-24905*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE EVOLUTION OF A RELEASE-ENGAGE MECHANISM FOR USE ON THE ORBITER
John Calvert *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 357-374 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-24869# Evaluation Associates, Inc., Bala Cynwyd, Pa.
RELIABILITY AND AVAILABILITY EVALUATION PROGRAM MANUAL
1 Nov. 1982 345 p refs
(Contracts N00030-79-C-0163; N00123-79-D-0616)
(AD-A124294; NAVSEA-OD-29304B) Avail: NTIS HC A15/MF A01 CSCL 14/4

This document is concerned primarily with evaluating the reliability and availability of strategic weapon systems and subsystems throughout the life-cycle of the program, including concept development, advanced development, full-scale development, production and deployment. However, not all contractors build subsystems; some supply equipments or other lower level assemblies. The methods presented in this manual are applicable to devices of any assembly level. Thus, the term system, as used herein, should be interpreted as the highest level assembly provided by a contractor. Evaluation as treated herein is normally quantitative, however, in some cases (e.g., the logistic phase of a mission), qualitative evaluation is performed. The major objectives of the evaluation program are: to establish reliability design criteria; to provide periodic assessments of achieved reliability; to identify RMA (Reliability, Maintainability, and Availability) problem areas; and to provide evidence of compliance with contractual requirements. GRA

N83-24870# Southwest Research Inst., San Antonio, Tex.
NONDESTRUCTIVE TESTING OF LARGE STEAM-TURBINE ROTORS Final Report
R. P. Meister, H. T. Gruber, D. T. Hayford, M. L. Rhoten, O. A. Ullrich, and B. Jacobs Dec. 1982 233 p refs Prepared in cooperation with Battelle Columbus Labs., Ohio
(EPRI Proj. 502-2)

(DE83-901108; EPRI-NP-2736) Avail: NTIS HC A11/MF A01

A steam turbine rotor lifetime prediction system was developed using field ultrasonic inspection results as input. The major efforts included development of data analysis techniques, evaluation of alternate nearbore inspection techniques, development of a boresonic inspection system (BUCS) representative of commercial inspection system, inspection of three retired rotors, and destructive analysis of the three rotors to compare ultrasonic results with actual flaw location and dimensions. Each of these subtasks, with the exception of the data analysis and the addition of a discussion of an advanced ultrasonic boresonic system (TREES) is reported. Both the BUCS and TREES inspection results described the flaw locations and sizes accurately. After flaws of interest were identified using the boresonic systems, operator interpretation of the ultrasonic signals is necessary to help distinguish serious from innocuous flaws. Two of the three rotors retired for large crack like indications were found to contain residual ingot defects. DOE

N83-24871# Pacific Northwest Lab., Richland, Wash.
NEAR-SURFACE CRACK DETECTION IN NUCLEAR PRESSURE VESSELS

F. L. Becker 1982 4 p refs Presented at the 5th Intern. Conf. on Quantitative NDE in the Nucl. Ind., San Diego, Calif., 10 May 1982

(Contract DE-AC06-76RL-01830)

(DE82-019184; PNL-21-10455; CONF-820563-6) Avail: NTIS HC A02/MF A01

The effectiveness of underclad crack detection for cracks of concern in the event of a pressurized thermal shock event is discussed. This data is used to evaluate the impact of ISI in reducing the failure probability under postulated PTS conditions. It is concluded that near surface defects, 6 mm and greater, under strip type cladding can be detected with a high degree of confidence. The effectiveness of crack detection through manual clad remains to be demonstrated. Immersion techniques as well as other clad types are evaluated. DOE

N83-24872# Hanford Engineering Development Lab., Richland, Wash.
THERMAL NDE METHOD FOR THERMAL SPRAY COATINGS

D. R. Green, M. D. Schmeller (Puget Sound Naval Shipyard, Bremerton, Wash.), and R. A. Sulit (Naval Sea Systems Command, Washington, D.C.) 1982 7 p refs Presented at the Marine Technol. Soc. and Geol. Soc. of Am. Conf. on Oceans, Washington, 20-22 Sep. 1982

(Contract DE-AC06-76FF-02170)

(DE82-020641; HEDL-SA-2650; CONF-820926-3) Avail: NTIS HC A02/MF A01

A feasibility demonstration of a thermal scanning nondestructive evaluation (NDE) system for thermal spray coatings is described. Non-bonds were detected between several types of coatings and their substrates. Aluminum anti-skid coatings having very rough surfaces were included. A technique for producing known non-bond areas for calibrating and demonstrating NDE methods was developed. DOE

N83-24873# Southwest Research Inst., San Antonio, Tex.
RELIABILITY OF STEAM-TURBINE ROTORS. TASK 1: LIFE-TIME PREDICTION ANALYSIS SYSTEM Final Report

P. K. Nair, H. G. Pennick, J. E. Peters, and C. H. Wells Dec. 1982 47 p refs

(EPRI Proj. 502-1)

(DE83-901096; EPRI-NP-2661) Avail: NTIS HC A03/MF A01

A computerized lifetime prediction analysis system (STRAP) for the automatic evaluation of rotor integrity based upon the results of a boresonic examination of near-bore defects was developed. Concurrently an advanced boresonic examination system (TREES), designed to acquire data automatically for lifetime analysis, was developed and delivered to the maintenance shop of a major utility. This system and a semiautomated, state of the art system (BUCS) were evaluated on two retired rotors. A modified nonproprietary version of STRAP, called SAFER, is now available for rotor lifetime prediction analysis. STRAP and SAFER share a common fracture analysis postprocessor for rapid evaluation of either conventional boresonic amplitude data or TREES cell data. The final version of this postprocessor contains general stress intensity correlations for elliptical cracks in a radial stress gradient and provision for elastic-plastic instability of the ligament between an imbedded crack and the bore surface. Both linear elastic and ligament rupture models were developed for rapid analysis of linkup within three dimensional clusters of defects. Bore stress rupture criteria are included. Physical and mechanical properties of air-melt 1CrMoV forgings are built into the program; however, only bounding values of fracture toughness versus temperature are available. Owing to the lack of data regarding the probability of flaw detection for the boresonic systems and of quantitative verification of the flaw linkup analysis, automatic evaluation of boresonic results is not recommended, and the lifetime prediction system is currently restricted to conservative, deterministic analysis of specified flaw geometries. DOE

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-24874*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
STRESS INTENSITY AND DISPLACEMENT COEFFICIENTS FOR RADIALLY CRACKED RING SEGMENTS SUBJECT TO THREE-POINT BENDING

Bernard Gross and John E. Srawley Mar. 1983 19 p refs (NASA-TM-83059; E-1524; NAS 1.15:83059) Avail: NTIS HC A02/MF A01 CSCL 20K

The boudary collocation method was used to generate Mode 1 stress intensity and crack mouth displacement coefficients for internally and externally radially cracked ring segments (arc bend specimens) subjected to three point radial loading. Numerical results were obtained for ring segment outer to inner radius ratios (R sub o/ R sub i) ranging from 1.10 to 2.50 and crack length to width ratios (a/W) ranging from 0.1 to 0.8. Stress intensity and crack mouth displacement coefficients were found to depend on the ratios R sub o/R sub i and a/W as well as the included angle between the directions of the reaction forces. S.L.

N83-24875*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
VAPOR CAVITATION IN DYNAMICALLY LOADED JOURNAL BEARINGS

Bo. O. Jacobson (Lulea Univ.) and Bernard J. Hamrock 1983 14 p refs Proposed for presentation at the 2d Intern. Conf. on Cavitation, Edinburgh, 5-8 Sep. 1983

(NASA-TM-83366; E-1401; NAS 1.15:83366) Avail: NTIS HC A02/MF A01 CSCL 20K

High speed motion camera experiments were performed on dynamically loaded journal bearings. The length to diameter ratio of the bearing, the speed of the roller and the tube, the surface material of the roller, and the static and dynamic eccentricity of the bearing were varied. One hundred and thirty-four cases were filmed. The occurrence of vapor cavitation was clearly evident in the films and figures presented. Vapor cavitation was found to occur when the tensile stress applied to the oil exceeded the tensile strength of the oil or the binding of the oil to the surface. The physical situation in which vapor cavitation occurs is during the squeezing and sliding motion within a bearing. Besides being able to accurately capture the vapor cavitation on film, an analysis of the formation and collapse of the cavitation bubbles and characteristics of the bubble content are presented. S.L.

N83-24876*# Grumman Aircraft Engineering Corp., Bethpage, N.Y.
DESIGN AND FABRICATION OF REALISTIC ADHESIVELY

BONDED JOINTS
Peter Shyprykevich May 1983 32 p refs Sponsored in part by Army Research and Technology Labs.
(Contract NAS1-16952)
(NASA-CR-166099; NAS 1.26:166099) Avail: NTIS HC A03/MF A01 CSCL 20K

Eighteen bonded joint test specimens representing three different designs of a composite wing chordwise bonded splice were designed and fabricated using current aircraft industry practices. Three types of joints (full wing laminate penetration, two side stepped; midthickness penetration, one side stepped; and partial penetration, scarfed) were analyzed using state of the art elastic joint analysis modified for plastic behavior of the adhesive. The static tensile fail load at room temperature was predicted to be: (1) 1026 kN/m (5860 lb/in) for the two side stepped joint; (2) 925 kN/m (5287 lb/in) for the one side stepped joint; and (3) 1330 kN/m (7600 lb/in) for the scarfed joint. All joints were designed to fail in the adhesive. Author

N83-24877# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
THE DESIGN OF SINGLE ANGLE STRUTS
S. T. Woolcock and S. Kitipornchai Dec. 1980 69 p refs
(RR-CE-19) Avail: NTIS HC A04/MF A01

The state of the art of eccentrically loaded single angle compression member design is reviewed. Current code rules and standard practices vary greatly in their treatment and there does not seem to exist a generally accepted method of design. A three dimensional computer model is developed to examine the elastic behavior of fully welded trusses and in particular the degree of in and out of plans restraint. The particular cases when single angle web members are connected on the same sides and alternatively on the opposite sides of a Tee chord are examined in detail. A recommended design method which uses the combined stress interaction equation of AS 1250-1975 for buckling and bending in the plan perpendicular to the truss is proposed. Author

N83-24878# Queensland Univ., St. Lucia (Australia). Dept. of Civil Engineering.
CRITICAL ASSESSMENT OF THE INTERNATIONAL ESTIMATES FOR RELAXATION LOSSES IN PRESTRESSING STRANDS
A. V. Koretsky and R. W. Pritchard Jun. 1981 34 p refs
(RR-CE-25) Avail: NTIS HC A03/MF A01

Significant variations in the techniques of measuring relaxation losses in prestressing strands and in the relaxation values recommended by the Australian and International Standards and Design Codes are considered. A specially designed test frame is reported and its capabilities are demonstrated on a series of twenty-four relaxation tests. It is concluded on the basis of the test data obtained that test equipment should be more rigidly specified and standardized and that modifications are required to the current methods of estimating the magnitude of the strand relaxation. Modifications to the Australian Standards are suggested. Areas for particular emphasis are test methods, relaxation losses immediately after stressing, isothermal relationship between the relaxation values at 1000 hours and at ultimate and the time dependent relaxation relationships when steam curing is employed. S.L.

N83-24879# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
CONSOLIDATION OF AXI-SYMMETRIC BODIES SUBJECTED TO NON AXI-SYMMETRIC LOADING
J. P. Carter and J. R. Booker Jan. 1981 28 p refs
(RR-CE-20) Avail: NTIS HC A03/MF A01

In many cases the analysis of the consolidation of axisymmetric bodies subjected to non axisymmetric loading may be carried out without recourse to a full three dimensional treatment. Advantage may be taken of the axisymmetric nature of the body and field quantities such as displacement and pore pressure can be given a Fourier representation. The problem is then reduced from one in three spatial dimensions (r, theta, z) and the time domain to one in two spatial dimensions (r, z) and the time domain. The method is illustrated with two examples; one is a tunnelling problem, the other involves consolidation due to lateral loading of a pile. S.L.

N83-24880# Army Materials and Mechanics Research Center, Watertown, Mass.
WORK-IN-PROGRESS SESSIONS OF THE ARMY SYMPOSIUM ON SOLID MECHANICS: CRITICAL MECHANICS PROBLEMS IN SYSTEMS DESIGN Final Report
Sep. 1982 88 p refs Symp. held at Bass River, Mass., 21-23 Sep. 1982
(AD-A119497; AMMRC-MS-82-5) Avail: NTIS HC A05/MF A01 CSCL 20/11

The need for an effective means of evaluating the remaining useful life of a restored M60 tank after overhaul was indicated. This approach should lead to an increase in the tank's reliability measured in mean miles between failures. Failure analysis and correlation of data was evaluated. B.G.

N83-24881*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE 17TH AEROSPACE MECHANISMS SYMPOSIUM
May 1983 390 p refs Symp. held in Pasadena, Calif., 5-6 May 1983; sponsored by NASA, California Inst. of Tech., and LMSC
(NASA-CP-2273; NAS 1.55:2273) Avail: NTIS HC A17/MF A01 CSCL 20K

The proceedings of the Aerospace Mechanisms Symposium are reported. Technological areas covered include space lubrication, aerodynamic devices, spacecraft/Shuttle latches, deployment, positioning, and pointing. Devices for spacecraft tether, magnetic bearing suspension, explosive welding, and a deployable/retractable mast are also described. For individual titles, see N83-24882 through N83-24906.

N83-24882*# Martin Marietta Corp., Denver, Colo.
TETHERED SATELLITE CONTROL MECHANISM c15
Gilbert M. Kyrias *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 1-18 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

The tethered satellite control mechanisms consist of four major subsystems. The reel drive mechanism stores the tether. It is motor driven and includes a level wind to uniformly feed the tether to the reel. The lower boom mechanism serves two primary functions: (1) it measures tether length and velocity as the tether runs through the mechanism, and (2) it reads the tether tension at the reel. It also provides change the direction for the tether from the reel to the upper boom mechanism. The deployment boom positions the upper boom mechanism with satellite out of the cargo bay. The deployment function places the 500-kg satellite 20 m away from the Space Shuttle (producing a small natural gravity gradient force), impacts an initial velocity to the satellite for deployment, and allows for satellite docking at a safe distance from the body of the Space Shuttle. The upper boom mechanism (UBM) services three functions: (1) it provides tether control to the satellite as the satellite swings in and out of plane; (2) it reads tether tension in the low range during the early deployment and final retrieval parts of the mission; and (3) it produces additional tether tension at the reel when tether tension to the satellite is in the low range. S.L.

N83-24883*# European Space Agency, Noordwikj (Netherlands).
CONSIDERATIONS ON THE LUBRICATION OF SPACECRAFT MECHANISMS c37
Mervyn Briscoe and Mike J. Todd (UKAEA) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 19-38 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

Space tribology and a number of precepts to guide designers in its application are discussed. Of the many techniques available all, without exception, have limitations in performance. Two processes are discussed in more detail and their limitations

identified. Some performance results on a liquid space lubricant are given. S.L.

N83-24884*# Contraves Corp., Zurich (Switzerland). Dept. EKR.
SPACE TELESCOPE: SOLAR ARRAY PRIMARY DEPLOYMENT MECHANISM **c37**
Donald P. Chandler and Adolph Veit *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 39-54 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

The requirements, the design, and the test program which were carried out in producing the Space Telescope Solar Array (STSA) primary deployment mechanisms (PDM) are described. The PDM will be used to rotate the rolled solar array supporting boom from its launch position alongside the telescope housing, through 90 deg to its use position. After five years in space the array is to be rerolled and by use of the PDM swung back to its stowed position alongside the telescope housing for capture and return to Earth via the Space Shuttle. S.L.

N83-24885*# Schaeffer Magnetics, Inc., Chatsworth, Calif.
A BROADBASED ACTUATOR CONCEPT FOR SPACEFLIGHT APPLICATION **c37**
James C. Hammond *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 55-80 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

An electromechanical actuator is applicable to a variety of spaceflight requirements. Characterized by high torque and a small output step angle, the device is comprised of a coaxial, symmetrical arrangement in which a cup type harmonic drive is directly coupled to a pancake configuration drive motor. The motor, with its dual stator driving a common rotor, is one illustration of the concept of selective redundacy. Selective redundancy promotes the idea that redundancy, to be effective, must not compromise inherent design simplicity nor introduce new failure modes. The usefulness of the actuator is exemplified by its selection for a broad range of positioning and driving applications including TDRSS gimbal drives, Space Telescope deployment and latching machanisms, and Space Telescope secondary mirror drive, as well as others. S.L.

N83-24886*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE LINEAR BOOM ACTUATOR DESIGNED FOR THE GALILEO SPACECRAFT **c15**
Edgar F. Koch *In its* The 17th Aerospace Mech. Symp. May 1983 p 81-96 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

Because the linear boom actuator is to be used on a flight spacecraft, as opposed to a ground based application, there is a comprehensive set of requirements. First, of course, the actuator must be capable of positioning and holding the load. Initially the load as predicted to be 4448 N (1000 lb) but with subsequent spacecraft configuration changes the load has been greatly reduced to a constant tensile pull of 1477 N (332 lb) due to centrifugal force. Lesser compressive loads of 1317 N (296 centrifugal lb) may be experienced during launch and deployment. This actuator must have the maximum redundancy possible. Life requirements were defined by the 10.16 to 15.24 cm (4 to 6 in.) total liner travel expected during the five-year flight duration. Liner range required of the actuator was set at plus and minus 5.08 cm to accommodate configuration changes. S.L.

N83-24887*# Martin Marietta Corp., Denver, Colo.
POLARIZER MECHANISM FOR THE SPACE TELESCOPE FAINT OBJECT SPECTROGRAPH **c74**
Mark D. Thulson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 97-108 refs (For primary document see N83-24881 14-39) (Contract NAS5-24463)
Avail: NTIS HC A17/MF A01 CSCL 20F

The polarizer mechanism for the Space Telescope Faint Object Spectrograph is described. This device will allow spectropolarimetric measurements of faint astronomical objects. The mechanism employs a unique arrangement to meet functional requirements in a compact package and with only one actuator. Detailed tolerance analysis and a variety of tests indicate that the polarizer is capable of accurate and reliable performance. S.L.

N83-24888*# National Aeronautics and Space Administration, Washington, D. C.
DESIGN OPTIMIZATION OF HIGH-PERFORMANCE ELECTRODYNAMIC ACTUATORS FOR USE IN A CRYOGENICALLY COOLED TELESCOPE **c74**
J.-N. Aubrun, K. R. Lorell, and K. P. Silveira *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 109-120 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20F

An analysis and optimization of a mirror-actuator system for large excursion/high-frequency chopping is developed. The results of this analysis, combined with laboratory measurements of a prototype actuator operating at cryogenic temperatures, allow performance predictions to be made for a real system utilizing this technology. S.L.

N83-24889*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CONTROL OF LARGE THERMAL DISTORTIONS IN A CRYOGENIC WIND TUNNEL **c09**
John C. Gustafson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 121-142 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 14B

The National Transonic Facility (NTF) is a research wind tunnel capable of operation at temperatures down to 89K (160 R) and pressures up to 900,000 Pa (9 atmospheres) to achieve Reynolds numbers approaching 120,000,000. Wide temperature excursions combined with the precise alignment requirements of the tunnel aerodynamic surfaces imposed constraints on the mechanisms supporting the internal structures of the tunnel. The material selections suitable for this application were also limited. A general design philosophy of utilizing a single fixed point for each linear degree of freedom and guiding the expansion as required was adopted. These support systems allow thermal expansion to take place in a manner that minimizes the development of thermally induced stresses while maintaining structural alignment and resisting high aerodynamic loads. Typical of the support mechanisms are the preload brackets used in the fan shroud system and the Watts linkage used to support the upstream nacelle. The design of these mechanisms along with the basic design requirements and the constraints imposed by the tunnel system are discussed. S.L.

N83-24890*# National Space Development Agency, Ibaraki (Japan).
EVALUATION OF SCANNING EARTH SENSOR MECHANISM ON ENGINEERING TEST SATELLITE 4 **c15**
Masami Ikeuchi, Yasufumi Wakabayashi, Yoshiaki Ohkami (National Aerospace Lab.), Takashi Kida (National Aerospace Lab.), Takeo Ishigaki (Matsushita Research Inst.), and Mikio Matsumoto (Matsushita Research Inst.) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 143-156 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

The results of the analysis and the evaluation of flight data obtained from the horizon sensor test project are described. The rotary mechanism of the scanning earth sensor composed of direct drive motor and bearings using solid lubricant is operated satisfactorily. The transmitted flight data from Engineering Test Satellite IV was evaluated in comparison with the design value. S.L.

N83-24891*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SECURING MECHANISM FOR THE DEPLOYABLE COLUMN OF THE HOOP/COLUMN ANTENNA **c37**
Elvin L. Ahl, Jr. *In* JPL The 17th Aerospace Mech. Symp. May

1983 p 157-170 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

The Column Longeron Latch (CLL) was designed and developed as the securing mechanism for the deployable, telescoping column of the Hoop/Column antenna. The column is an open lattice structure with three longerons as the principal load-bearing members. It is divided into telescoping sections that are deployed after the antenna is place in Earth orbit. The CLL provides a means to automatically lock the longeron sections into position during deployment as well as a means of unlocking the sections when the antenna is to be restowed. The CLL is a four bar linkage mechanism using the over center principle for locking. It utilizes the relative movement of the longeron sections to activate the mechanism during antenna deployment and restowing. The CLL design is one of the first mechanisms developed to meet the restowing requirements of spacecraft which will utilize the STS retrieval capability. S.L.

N83-24892*# Fairchild Space and Electronics Co., Germantown, Md.
A HIGH STRENGTH, TORSIONALLY RIGID, DEPLOYABLE AND RETRACTABLE MAST FOR SPACE APPLICATIONS c15
Lamont DiBiasi and Richard Kramer *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 171-180 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

A structural mast was developed which during and after full deployment produces a supporting structure with the characteristics of a high bending moment capability, high stiffness and, particularly important for instrument deployment, a high degree of position repeatability and torsional rigidity. These features were accomplished while providing and easily retractable mast with a high life cycle capability. Since these properties are consistent throughout the full range of deployed lengths, partial deployments or retractions can be utilized for checkout, balance, fine tuning or whatever other reason may be deemed necessary for operation modes or spacecraft stability. S.L.

N83-24893*# Martin Marietta Aerospace, Orlando, Fla.
CANNON LAUNCHED ELECTROMECHANICAL CONTROL ACTUATION SYSTEM DEVELOPMENT
James G. Johnston *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 181-198 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20K

The evolution of an electromechanical control actuation system from trade study results through breadboard test and high-g launch demonstration tests is summarized. Primary emphasis is on design, development, integration and test of the gear reduction system. S.L.

N83-24894*# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
TWO HUNDRED PASSAGE THREE-WAY VALVE: FRACTION COLLECTOR c37
Jay L. Keffer *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 199-208 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13K

This paper describes the design and operation of a fraction collector used to direct flow of separated biological materials from 197 capillary tubes to either a collection tray or to a waste tank. This mechanism uses a 28-volt dc gear motor driving twin cams to force 197 needles through a self-sealing silicone rubber septum, where they inject the material in 197 separate pockets in a collection tray. The position of the collector tray is sensed by two optical limit switches. The time sequences are controlled automatically by an electronics control monitoring module. Author

N83-24895*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
NUTATION DAMPER SYSTEM c15
Donald R. Sevilla *In its* The 17th Aerospace Mech. Symp. May 1983 p 209-226 ref (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 03A

The Nutation Damper System is a three function mechanism designed for the Galileo Spacecraft, a spin stabilized deep-space probe to Jupiter. By damping the movement of a large deployable science boom acting as an outboard pendulum, the nutation damper rapidly stabilizes the spacecraft from dynamic irregularities. The system includes the boom deployment device and the ultra-low friction boom hinge. This paper describes the mechanism, the degree to which friction, stiction and lost motion have been eliminated, and the unique test methods that allow its performance to be measured. Author

N83-24896*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
PRACTICAL SMALL-SCALE EXPLOSIVE SEAM WELDING c37
Laurence J. Bement *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 227-244 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20K

A small-scale explosive seam welding process has been developed that can significantly contribute to remote metal joining operations under hazardous or inaccessible conditions, such as nuclear reactor repair and assembly of structure in space. This paper describes this explosive seam welding process in terms of joining principles, variables, types of joints created, capabilities, and applications. Very small quantities of explosive in a ribbon configuration are used to create narrow (less than 0.5 inch), long-length, uniform, hermetically sealed joints that exhibit parent metal properties in a wide variety of metals, alloys, and combinations. The practicality of this process has been demonstrated by its current acceptance, as well as its capabilities that are superior in many applications to the universally accepted joining processes, such as mechanical fasteners, fusion and resistance welding, and adhesives. Author

N83-24897*# Martin Marietta Corp., Denver, Colo.
THE MANNED MANEUVERING UNIT FLIGHT CONTROLLER ARM c15
Ken E. Falkner *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 245-252 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

The Manned Maneuvering Unit (MMU) and its support equipment provide an extravehicular astronaut mobility, and the ability to work outside the confines of the Shuttle Orbiter payload bay. The MMU design requirements are based on the highly successful Skylab M-509 maneuvering unit. Design of the MMU was started as an R&D effort in April 1975 and Flight Hardware design was started in August 1979 to support a possible requirement for in-space inspection and repair of Orbiter thermal protection tiles. Subsequently, the qualification test and production activities were slowed, and the current projected earliest first flight is now STS-11 in January, 1984. The MMU propulsion subsystem provides complete redundancy with two identical 'system'. Each system contains a high pressure gaseous nitrogen tank, an isolation valve, a regulator, and twelve 1.7 lbf (7.5 N) thrusters. The thrusters are packaged to provide the crew member six-degree-of-freedom control in response to commands from translational and rotational hand controllers. This paper discusses the MMU control arm requirements, design, and developmental history. B.W.

N83-24898*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
LATCH FITTINGS FOR THE SCIENTIFIC INSTRUMENTS ON THE SPACE TELESCOPE c37
Jan D. Dozier and Everett Kaelber (Perkin-Elmer) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 253-265 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

Latch fittings which kinematically mount the replaceable scientific instruments onto the Space Telescope must maintain precise alignment and thermal stability for on-orbit observations. Design features which are needed to meet stringent criteria include the use of ceramic isolators for thermal and electrical insulation, materials with different coefficients of thermal expansion for

athermalization, precision manufacturing procedures, and extremely tight tolerances. A specific latch fitting to be discussed is a ball-and-socket design. In addition, testing, crew aids, and problems will be covered. Author

N83-24899*# Sperry Flight Systems, Phoenix, Ariz.
THE DESIGN AND DEVELOPMENT OF A MOUNTING AND JETTISON ASSEMBLY FOR THE SHUTTLE ORBITER ADVANCED GIMBAL SYSTEM **c16**
Edward S. Korzeniowski *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 267-287 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

This paper describes the requirements, design development, and qualification of the mounting and jettison assembly (MJA) which serves as the base structure for the advanced gimbal system (AGS) developed for NASA, Marshall Space Flight Center, for use during shuttle missions. An engineering model of the MJA has been built and subjected to the following testing: stiffness and modal characterization, sine and random vibration, and a jettison function and energy release. A qualitative summary of the results and the problems encountered during testing, together with the design solutions, is presented. Author

N83-24900*# Planning Research Corp., Kennedy Space Center, Fla.
ROLLING BEAM UMBILICAL SYSTEM **c16**
Bemis C. Tatem, Jr. *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 289-304 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

The decision to make the Centaur Vehicle a Space Transportation System (STS) payload meant that new ground support equipment provisions at Launch Pads Pads 39A and 39B were required. These new equipment provisions were needed to service the Centaur vehicle while it was installed in the Orbiter's payload bay prior to launch. This paper describes the design of a new rolling beam umbilical syste (RBUS) being added to the pad fixed service structure (FSS) in order to provide the primary functions of liquid hydrogen (LH2) fill, drain, and vent. The carrier plate itself is a Government-furnished equipment item and of necessity became a T-O disconnect. This permits quick offloading in the event of an abort prior to lift-off. In addition to the rolling beam structure, mechanisms, and fluid lines, it was necessary to design and build a carrier plate simulator to support early development testing of the mast at the Launch Equipment Test Facility at Kennedy Space Center. The RBUS is designed to be compatible with the rotating service structure (RSS) to the extent that the umbilical may be deployed with the RSS mated with the vehicle. It is also designed to clear the RSS as the RSS rotates back out of the way. Accessibility to the Orbiter aft compartment via the 50-1 door had to be maintained. B.W.

N83-24901*# Saab-Space A.B., Linkoeping (Sweden).
DEPLOYMENT AND RELEASE MECHANISMS ON THE SWEDISH SATELLITE, VIKING **c37**
Stefan Eriksson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 305-314 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20K

Two mechanism types are presented, a rigid boom system and a 'hold and release' mechanism for spherical sensors. Both mechanisms have been designed, developed and tested by Saab-Space AB, Linkoping, Sweden for the VIKING project under a contract from the Swedish Space Corporation. Author

N83-24902*# Jet Propulsion Lab., California Inst. of Tech., Pasadena. Guidance and Control Sect.
DESIGN OF THE GALILEO REMOTE SCIENCE POINTING ACTUATORS **c37**
Fredrick W. Osborn *In its* The 17th Aerospace Mech. Symp. May 1983 p 315-332 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

This paper describes the two actuators developed for pointing the remote science instruments from the spinning Galileo spacecraft. Details of the key elements are presented together with their design features and developmental difficulties. Four techniques used for power and signal transfer across the actuators' rotating joints are also discussed. Author

N83-24903*# Mitsubishi Electric Mfg. Co. Ltd., Amagasaki (Japan).
A COMPACT MAGNETIC BEARING FOR GIMBALLED MOMENTUM WHEEL **c37**
K. Yabu-uchi, M. Inoue, S. Akishita, C. Murakami (National Aerospace Lab.), and O. Okamoto (National Aerospace Lab.) *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 333-342 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

A three axis controlled magnetic bearing and its application to a momentum wheel are described. The four divided stators provide a momentum wheel with high reliability, low weight, large angular momentum storage capacity, and gimbal control. Those characteristics are desirable for spacecraft attitude control. Author

N83-24904*# Ball Aerospace Systems Div., Boulder, Colo.
HINGE LATCH MECHANISM **c37**
John C. Walker *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 343-356 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

The device described in this paper is a modular hinge latch mechanism. It is used to latch and preload four motorized hinges after their deployment. The paper describes design requirements, hardware development and initial testing of this hinge latch module. A special effort has been made to cover the design philosophy incorpoated into this hardware. Author

N83-24905*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE EVOLUTION OF A RELEASE-ENGAGE MECHANISM FOR USE ON THE ORBITER **c37**
John Calvert *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 357-374 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 13I

The Release-Engage Mechanism (REM) is designed to secure a deployable payload in the orbiter during launch and to enable the payload to be released, deployed, and reattached for re-entry. This paper presents the following: (1) the initial design concepts of the Release-Engage Mechanism; (2) the problems encountered during assembly, (3) the abnormalities that occurred during vibration testing, (4) the incompatibility of the Remote Manipulator System and REM operation, and (5) the resulting modifications to the REM that assured its successful performance on two Shuttle flights. Author

N83-24906*# National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
PAYLOAD RETENTION FITTINGS FOR SPACE SHUTTLE PAYLOAD GROUND HANDLING MECHANISM **c16**
Vincent Cassisi *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 375-391 (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 22B

New ground fittings for Space Shuttle payload handling were designed, built, and tested by Government and contractor personnel at the NASA John F. Kennedy Space Center (KSC), Florida, from May 1981 through November 1982. Design evolution of the Space Shuttle Orbiter payload retention fittings, which contained a load-sensitive split bushing in a pillow-block housing, created an incompatibility between the interfacing ground and airborne equipment. New fittings were designed and successfully used beginning with the fifth Space Shuttle flight, STS-5. An active hydraulic spring system containing a gas accumulator in the hydraulic system provided the load relief required to protect the Orbiter bushing from damage. Author

N83-24907# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A NEW THEORY OF CYLINDRICAL SHELLS
A. V. KrishnaMurty Apr. 1983 17 p refs
(INPE-2714-RPE/431) Avail: NTIS HC A02/MF A01

Classical thin-shell theory involves a traditional inconsistency of coexisting zero transverse shear strains and nonzero transverse shear stresses. Shear deformation theories, normally, have no provision for the well-known parabolic transverse shear stress distribution across the shell wall. Avoiding these limitations, a new theory of cylindrical shells is given. Thin and shear deformation shell theories are special cases in this formulation. The theory given is used directly for the study of static and dynamic behavior of cylindrical isotropic shells, and is easily extended for composite and sandwich shells. Author

N83-24908# Central Electricity Generating Board, London (England).
STRUCTURAL VIBRATION DAMPER FOR CORROSIVE OR HIGH-TEMPERATURE GASEOUS ENVIRONMENTS
M. J. H. Fox (Berkeley Nuclear Lab., Gloucestershire, England) Dec. 1982 3 p
(CEGB-TDB-379; ISSN-0374-2784) Avail: NTIS HC A02/MF A01

The gas film damping insert is a robust device for the control of vibration of lightly damped structural components. It may be used in any situation where a pretensioned link between two parts of the structure in relative motion, or between the moving structure and Earth, is practicable. Damping is provided by viscous shear forces in thin gas layers, avoiding problems of compatibility associated with the use of viscoelastic materials or viscous oils and those of wear associated with sliding and impacting devices. Author

N83-24909# Ohio State Univ., Columbus. Research Foundation.
ADVANCES AND TRENDS IN PLATE BUCKLING RESEARCH
Arthur W. Leissa Dec. 1982 22 p refs
(Contract N00014-80-C-0281)
(AD-A123358; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20/11

Recent advances and current trends in plate buckling research are summarized. The field is divided into three parts: (1) classical buckling studies, including plates of rectangular, circular and other shapes; (2) classical complicating effects, including elastic foundation, anisotropic material, variable thickness, shear deformation and nonhomogeneous material and; (3) nonclassical considerations, including postbuckling, imperfections, parametric excitation, follower forces, magnetoelastic buckling and inelastic buckling. Approximately 100 references for the period 1978-present are cited. GRA

N83-24910# Lehigh Univ., Bethlehem, Pa. Materials Research Center.
EFFECT OF TEST FREQUENCY AND WATER CONTENT ON LOCALIZED CRACK-TIP HEATING IN NYLON 66
M. T. Hahn, Richard W. Hertzberg, John A. Manson, Reinhold W. Lang, and P. E. Bretz Dec. 1982 25 p refs Submitted for publication Sponsored in part by IBM Foundation
(Contracts N00014-77-C-0633; N00014-77-C-1234; NR Proj. 356-670)
(AD-A124156; TR-15) Avail: NTIS HC A02/MF A01 CSCL 20/11

Fatigue crack propagation (FCP) tests were conducted on nylon 66 specimens equilibrated over a range of moisture levels and test frequencies to determine the crack growth rates and the crack-tip temperatures as a function of water content. Frequency-sensitivity was correlated with the amount of crack-tip heating taking place, with crack-tip temperature being found to depend strongly on the estimated loss compliance, D', of the material. The frequency-sensitivity of FCP in nylon was seen also to be affected by mean stress, suggesting that creep processes are often significant in FCP of nylon. Author (GRA)

N83-24911# California Univ., Livermore. Lawrence Livermore Lab. Methods Development Group.
NIKE2D: A VECTORIZED, IMPLICIT, FINITE-DEFORMATION, FINITE-ELEMENT CODE FOR ANALYZING THE STATIC AND DYNAMIC RESPONSE OF 2-D SOLIDS
J. O. Hallquist Feb. 1983 112 p refs
(DE83-008177; UCID-19677) Avail: NTIS HC A06/MF A01

A user's manual for NIKE2D is presented and the implicit algorithm is described. Sample applications are presented which include a simulation of the necking of a uniaxial tension specimen, a static analysis of an O-ring seal, and a cylindrical bar impacting a rigid wall. NIKE2D is a fully vectorized, implicit, finite deformation, large strain, finite element code for analyzing the response of two dimensional axisymmetric and plane strain solids. A variety of loading conditions can be handled including traction boundary conditions, displacement boundary conditions, concentrated nodal point loads, body force loads due to base accelerations, and body force loads due to spinning. Slidelines with interface friction are available. Elastic, orthotropic elastic plastic, thermoelastic plastic, soil and crushable foam, linear viscoelastic, thermoorthotropic elastic, and elastic creep materials models are implemented. Nearly incompressible behavior that arises in plasticity problems and elasticity problems with Poisson's ratio approaching 0.5 is accounted for in the element formulation to preclude mesh lockups and associated anomalous stress states. Four node isoparametric elements are used for the spatial discretization, and profile (bandwidth) minimization is optional. DOE

N83-24912# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
THERMAL STRESS ANALYSIS OF AN ALUMINUM-MYLAR TRANSFORMER COIL
B. R. Dewey Feb. 1982 20 p refs
(Contract W-7405-eng-26)
(DE82-007728; ORNL/TM-8095) Avail: NTIS HC A02/MF A01

Linear finite element modeling techniques were used to study temperature and stress distribution in a Mylar aluminum transformer coil. First, approaches to dividing the structure into discrete elements were investigated. A simplified model was adequate for predicting maximum stresses and displacements. Stress distributions produced with stainless steel and with fiberglass outer coverings were compared. The fiberglass covered coil showed a peak interlayer pressure of about 4.3 MPa (600 psi) and a maximum hoop stress of about -20 MPa (3000 psi). Corresponding stresses in the stainless steel covered coil were about one third higher. In both cases the maximum interlayer pressure is at the center plane of the coil about halfway between the inner and outer surfaces. Simplifying these assumptions should provide results adequate for identifying problem areas within the coil. DOE

N83-24913# General Electric Co., Sunnyvale, Calif. Advanced Reactor Systems Dept.
INELASTIC ANALYSIS OF DISSIMILAR METALLIC PIPE JOINTS FOR CRBRP APPLICATION
C. C. Yang and A. W. Dalcher 19 Jan. 1982 22 p refs Presented at the ASME Pressure Vessel and Piping Conf., Orlando, Fla., 27 Jun. - 2 Jul. 1982
(Contract DE-AM03-76SF-0893)
(DE82-011435; GEFR-SP-260; CONF-820601-3) Avail: NTIS HC A02/MF A01

A preliminary inelastic analysis of a dissimilar metallic transition joint was made based on the piping design specification for CRBRP applications. The transition joint was analyzed to satisfy the elevated temperature ASME Code requirements. The transition joint analyzed is a tri-metallic joint composed of 316 stainless steel, alloy 800 H, and 2-1/4 Cr-1Mo steel sections. The preliminary results from this analysis showed that the plastic deformation occurs predominantly in the alloy 800 H section, while the accumulated inelastic strain due to creep is much more significant in the 2-1/4 Cr-1Mo section. The region of this transition joint which experiences the greatest amount of accumulated damage is at the interface of the 2-1/4 Cr-1Mo steel and the Inconel 82 weldment. DOE

N83-24914# Washington Univ., Seattle. Dept. of Mechanical Engineering.
DYNAMIC FRACTURE AND DEPRESSURIZATION IN PIPES Annual Report
A. F. Emery, A. S. Kobayashi, and W. J. Love Jun. 1982 120 p refs Sponsored by EPRI
(EPRI Proj. 231-1)
(DE82-905283; EPRI-NP-2440) Avail: NTIS HC A06/MF A01

Predictive models for initiation and rapid propagations of ductile axial and circumferential cracks and the associated depressurization response in pipes are contained. Three dimensional static stress intensity factors of circumferential through cracks of various crack lengths and in a pipe subjected to uniform axial tension, uniform axial displacement, pure bending at pipe ends and three point bending with the crack on the tension side were obtained. The thermal hydraulic code LEAKER as well as an updated version of a closed form solution of depressurization equations for large, axial-crack-induced breaches was used to predict the depressurization and maximum rate of depressurization of axially cracking pipes. The initiation and propagation of circumferential through cracks in the presence of large scale yielding in a 32 in. diameter pipe subjected to axial tension, axial displacement and fixed-end rotation were conducted by using the elastic-plastic finite difference shell code. DOE

N83-24915# National Bureau of Standards, Washington, D.C. Center for Materials Science.
ENERGY-RELEASE RATE ASSOCIATED WITH DIFFUSIONAL CRACK GROWTH
Tze-jer Chuang Dec. 1982 32 p refs
(Contract DE-AI05-80OR-20679)
(DE83-005564; NBSIR-82-2628) Avail: NTIS HC A03/MF A01

A general expression for the energy release rates (G) that arise during steady state crack propagation by diffusion is derived from the standpoint of irreversible thermodynamics. Three contributing components of G are identified: (1) the Griffith energy (G/sub Gr/); (2) heat generated in the process of surface diffusion; and (3) grain boundary diffusion. Further, the total G is shown to be directly related to the well known J-integral if formulated in the framework of finite deformation elasticity. This expression for G is valid in general even if the response of the material is not linear and the mass transport kinetics does not follow Fick's law. Quantitative evaluations of each component are made for the linear case where field solutions are available. The results show that component (2) is approximately equal to G/sub Gr/ and is independent of the crack velocity (nu) whereas component (3) is a monotonically increasing function with G starting from 0.85 G/sub Gr/ when nu is at threshold value; and that strain energy constributions can be neglected leading to G = J = (1-(MU)(2))K(2)/E. DOE

N83-24916# Sandia Labs., Albuquerque, N. Mex.
A RANDOM VIBRATION CONTROL SYSTEM FOR TESTING A SINGLE TEST ITEM WITH MULTIPLE INPUTS
David O. Smallwood 1982 7 p refs Presented at the SAE Aerospace Meeting, Anaheim, Calif., 25 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE82-018973; SAND-82-1631C; CONF-821019-1) Avail: NTIS HC A02/MF A01

A multiple shaker control system developed for driving a single test item with random excitation was developed. The system allows for cross-coupled mechanical systems with partially coherent control points. The system uses time domain randomization to generate the continuous Gaussian drive signals. DOE

N83-24917# Sandia Labs., Albuquerque, N. Mex.
CASE HISTORY OF TANTALUM-WELD CRACKING
G. A. Knorovsky 1982 12 p refs Presented at the 25th Meeting of the IMOG Subgroup on Joining, Kansas City, Mo., 25 Apr. 1982
(Contract DE-AC04-76DP-00789)
(DE82-020358; SAND-82-1789C; CONF-820476-1) Avail: NTIS HC A02/MF A01

Tantalum welding is normally a routine operation. The routine involves careful cleaning beforehand, and welding in an atmosphere excludes reactive gases (O2, N2, H2). A weld cracking problem was encountered despite the fact that normal precautions were taken. This account reviews what happened, the analytical procedures followed to determine the unusual source of the problem, and the remedy which solved the problem. DOE

N83-24918# Southwest Research Inst., San Antonio, Tex.
STEAM-TURBINE-DISC CRACKING EXPERIENCE. VOLUME 2: DATA SUMMARIES AND DISCUSSION Final Report
F. F. Lyle, Jr. and H. C. Burghard, Jr. Jun. 1982 67 p refs Sponsored by EPRI
(EPRI Proj. 1398-5)
(DE82-905834; EPRI-NP-2429-Vol-2) Avail: NTIS HC A04/MF A01

Key variables for cracking in bores and keyways and in rim attachments of shrunk-on disc used in low pressure (LP) rotors in nuclear power plants are identified. A review was conducted of available data concerning disc cracking experience in other countries, factors governing stress corrosion cracking of low alloy steels, and factors determining environments present in LP turbines. Disc cracking experience in plants were determined from a survey of utilities and a series of visits to utilities. DOE

N83-24919# Sandia Labs., Livermore, Calif. Acceptance Technology Div.
USE OF ULTRASONIC SIGNAL ANALYSIS IN THE DETECTION OF DEFORMATION-INDUCED CAVITATION
G. H. Thomas, S. H. Goods, and A. F. Emery (Washington Univ.) Dec. 1982 18 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005902; SAND-82-8252) Avail: NTIS HC A02/MF A01

A correlation between the change in ultrasonic wave forms and increasing strain in an aluminum alloys, 6061-T6, has been obtained at high strain levels. Sophisticated signal processing techniques have revealed a complex interaction of the frequency components of a high frequency ultrasonic pulse as it passes through a deformed tensile specimen. It is believed that strain-induced microstructural changes in the aluminum attenuate the acoustic energy. One of the possible attenuation mechanisms is the formation of deformation induced cavities at recipitates and inclusions which scatter the ultrasonic energy. Thus, measuring the signal attenuation at the appropriate frequencies determines the degree of deformation-induced cavitation. DOE

42 GEOSCIENCES (GENERAL)

N83-24920*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
SATELLITE-TRACKING AND EARTH DYNAMICS RESEARCH PROGRAMS Semiannual Progress Report, 1 Jul. - 31 Dec. 1982
May 1983 77 p refs
(Grant NGR-09-015-002)
(NASA-CR-170341; NAS 1.26:170341; SAPR-47) Avail: NTIS HC A05/MF A01 CSCL 08G

Tracking of LAGEOS for polar motion and Earth rotation studies and for other geophysical investigations, including crustal dynamics, Earth and ocean tides, and the general development of precision orbit determination continues. The BE-C and Starlette satellites were tracked for refined determinations of station coordinates and the Earth's gravity field and for studies of solid Earth dynamics.
S.L.

N83-24921# Geological Survey, Washington, D. C.
GEOLOGICAL STUDIES OF THE COST NOS. G-1 AND G-2 WELLS, UNITED STATES NORTH ATLANTIC OUTER CONTINENTAL SHELF
Peter A. Scholle, ed. and Chiye R. Wenkam, ed. 1982 202 p refs

(USGS-Circ-861) Avail: NTIS HC A09/MF A01

Core sampling and multichannel seismic reflection investigations of the Georges Bank basin are reported. Maps, charts, and graphs summarize results of studies of the lithology, stratigraphy, paleoenvironments, and deposition cycles. Organic geochemical analysis, calculation of basin subsidence, and geomagnetic and magnetic anomaly locations are included. For individual titles, see N83-24922 through N83-24931.

N83-24922# Geological Survey, Washington, D. C.
GEOLOGICAL STUDIES OF THE COST NOS. G-1 AND G-2 WELLS, UNITED STATES NORTH ATLANTIC OUTER CONTINENTAL SHELF: INTRODUCTION **c46**
Peter A. Scholle, ed. and Chiye R. Wenkam, ed. *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 1-3 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Data from geophysical logs, and examination of conventional cores, well-cuttings, and sidewall cores show that below 10,000 ft, the strata in both wells have moderate porosities and low to moderate permeabilities and are thus considered adequate to poor reservoir rocks. Measurements of vitrinite reflectance, color alteration of visible organic matter, and various geochemical properties suggest that the Tertiary and Cretaceous strata of COST G-1 and G-2 wells are not prospective for oil and gas. The Jurassic rocks at the G-1 site do contain small amounts of thermally mature gas-prone kerogens. At G-2, these Jurassic rocks are also gas-prone and are slightly richer in organic carbon and total extractable hydrocarbons the G-1 rocks, but both sites have only poor to fail oil and gas source-rock potential. A.R.H.

N83-24923# Geological Survey, Washington, D. C.
GEOLOGIC SETTING OF THE GEORGES BANK BASIN **c46**
John S. Schlee and Kim D. Klitgord *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 4-10 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Underlain by a wedge of Triassic and younger sedimentary rock that overlies rifted basement, the Georges Bank is tectonically a collection of smaller subbasins, some of which are linear grabens that trend northeast. Structurally, the basin is situated between the LaHave platform to the northwest, the Gulf of Maine platform to the north, and the Long Island platform to the west. The deepest, most restricted part of the basin may contain as much as 26,250 of Lower Jurassic and older nonmarine clastic rocks and evaporite deposits. The stratigraphy of the basin, as determined from rocks recovered from COST G-1 and G-2 wells is examined. A.R.H.

N83-24924# Geological Survey, Washington, D. C.
LITHOLOGY AND PETROGRAPHY OF THE COST NOS. G-1 AND G-2 WELLS **c46**
Michael A. Arthur *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 11-33 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Drilled on a basement high to a depth of 16,071 ft, the COST G-1 well is located in shallower water, farther inshore than the COST G-2 well, which was drilled to a depth of 21,874 ft. The sedimentary sections penetrated in each well are divided into four major lithologic units and are described stratigraphically from the bottom to the top. A.R.H.

N83-24925# Geological Survey, Washington, D. C.
CALCAREOUS NANNOFOSSIL BIOSTRATIGRAPHY AND PALEOENVIRONMENT OF THE COST NOS. G-1 AND G-2 WELLS IN THE GEORGES BANK BASIN **c46**
Page C. Valentine *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 34-42 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

The oldest sedimentary rocks sampled in the COST Nos. G-1 and G-2 wells are not fossiliferous and are of questionable Early Jurassic to Late Triassic age. During Jurassic and Early Cretaceous time, most of the sediments in the Georges Bank basin were deposited in a fluctuating nonmarine to shallow marine environment. There is evidence however, that deeper marine shelf conditions occurred during the Berriasian at both well sites and also during Valanginian and Hauterivian time at the G-2 site. Marine shelf environments existed during most of the Late Cretaceous, except during the Cenomanian, when there was shallower water over the G-1 site. There is a hiatus at the Cretaceous-Tertiary boundary, and Campanian and Maestrichtian strata are missing from both sections. Study of samples of Tertiary strata shows that a marine carbonate shelf province existed in the basin during the Eocene. A.R.H.

N83-24926# Geological Survey, Washington, D. C.
FORAMINIFERAL AND SEISMIC STRATIGRAPHY, PALEOENVIRONMENTS AND DEPOSITIONAL CYCLES IN THE GEORGES BANK BASIN **c46**
C. Wylie Poag *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 43-92 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Biostratigraphic analyses of foraminiferal assemblages sampled from rotary cuttings taken at 10 ft to 90 ft intervals were used with interpretation of seismic sequences to determine the presence of nonconformities and to establish a chronostratigraphic framework for COST G-1 and G-2 wells. The chronostratigraphic sequences were then used to calculate sediment accumulation rates. Lithostratigraphic and chronostratigraphic units were compared with those of the Scotian Basin of Canada, and correlations were established between the COST G-2 and the Shell Mohican L-100 wells. Paleoenvironmental analysis was based on the microfossil record of the G-1 and G-2 wells and on interpretation of seismic facies along USGS multichannel line 19. A.R.H.

N83-24927# Geological Survey, Washington, D. C.
SIGNIFICANCE OF THE MESOZOIC CARBONATE BANK-REEF SEQUENCE FOR THE PETROLEUM GEOLOGY OF THE GEORGES BANK BASIN **c46**
Robert E. Mattick *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 93-104 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

The development of the continental shelf margin during Jurassic time is analyzed and an effort is made to show the relationship between carbonate facies, which may or may not be significantly porous, and basinal facies, which may contain large amounts of marine-derived organic carbon. Areas in which these facies are in proximity may prove to be areas where significant amounts of petroleum have accumulated in stratigraphic traps. A.R.H.

N83-24928# Geological Survey, Washington, D. C.
ORGANIC GEOCHEMISTRY OF THE GEORGES BANK BASIN COST NOS. G-1 AND G-2 WELLS **c46**
R. E. Miller, H. E. Lerch, G. E. Claypool, M. A. Smith, D. K. Owings, D. T. Ligon, and S. B. Eisner *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 105-142 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

The source-rock characteristics of the stratigraphic intervals that may be considered prospects for the generation of oil or natural gas in the COST Nos. G-1 and G-2 wells from the Georges Bank basin are compared. The depth of burial required for the onset of thermal maturation processes is assessed and the geochemical effects that mud additives may have on the source-rock interpretations are evaluated. A.R.H.

N83-24929# Geological Survey, Washington, D. C.
THERMAL HISTORY OF THE GEORGES BANK BASIN **c44**

Michael A. Arthur *In its* Geol. Studies of the COST nos. G-1 and G-2 wells, U.S. North Atlantic Outer Continental Shelf 1982 p 143-152 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Aspects of the present-day thermal gradient and the thermal history of the Georges Bank basin are discussed based on data from the COST Nos. G-1 and G-2 wells. Basin subsidence, sedimentation, and continental margin evolution are considered with regard to the indications of thermal maturity in sedimentary organic matter and possible hydrocarbon generation in the basin. A.R.H.

N83-24930# Geological Survey, Washington, D. C.
GEOPHYSICAL STUDIES OF THE COST NOS. G-1 AND G-2 WELLS **c46**
David J. Taylor and R. C. Anderson *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 153-159 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

Ditigal well log data from the COST Nos. G-1 and G-2 wells were used to compute subsurface velocities and synthetic seismograms. The interval-traveltime log from each well was integrated over each respective depth range, producing a relationship between depth and two-way traveltime for a seismic wave propagating through the subsurface. This relationship was used to convert the suite of well logs recorded as a function of linear depth to linear functions of time. The interval-traveltime log also privided other velocity information relevant to seismic reflection processing and interpretation. Synthetic seismograms were also computed using the velocity and density logs from the wells. The synthetic seismograms were bandpass filtered to match the seismic field data for correlation, and then spliced into the seismic line at the appropriate location. Author

N83-24931# Geological Survey, Washington, D. C.
BASEMENT STRUCTURE, SEDIMENTATION AND TECTONIC HISTORY OF THE GEORGES BANK BASIN **c46**
Kim D. Klitgord, John S. Schlee, and Karl Hinz *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 160-186 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

A tectonic history is developed for the sediment-filled basins beneath Georges Bank by examining the crustal foundation beneath these basins and by outlining the stages in sedimentary buildup. The analysis of magnetic and gravity data integrated with seismic reflection profiles clues as to the nature of basement rocks, their depth of burial, composition, and tectonic setting. Interpretation of seismic reflection profiles and the correlation of seismic stratigraphic units with lithostratigraphic units at the COST Nos. G-1 and G-2 wells gives a history of basin filling over the past 200 m.y., including major trends in rock types and their thicknesses, relative ages of interregional unconformities and the relationship of the basin sedimentation to the construction of the adjacent continental slope and rise. A.R.H.

N83-24932# Woods Hole Oceanographic Institution, Mass.
SUMMER STUDY PROGRAM IN GEOPHYSICAL FLUID DYNAMICS: PARTICLE MOTIONS IN FLUIDS
George Veronis and Florence K. Mellor, ed. Nov. 1982 352 p refs Seminar held in Woods Hole, Mass., summer 1982
(Grants N00014-82-G-0079; NSF MCS-82-00450)
(AD-A122864; WHOI-82-45) Avail: NTIS HC A16/MF A01 CSCL 20/4

Particle motion in fluids is discussed. Eulerian flow, turbulence, dispersions, and tracer studies are discussed. R.J.F.

N83-24933# California Univ., Berkeley. Lawrence Berkeley Lab. Earth Sciences Div.
NUCLEAR WASTE ISOLATION, GEOPHYSICS AND RESERVOIR ENGINEERING, GEOSCIENCES Annual Report, 1981
Sep. 1982 192 p refs
(Contract DE-AC03-76SF-00098)
(DE83-004044; LBL-13600) Avail: NTIS HC A09/MF A01

Separate abstracts were prepared for the 59 papers of the 1981 annual report of the Earth Science Division at Lawrence Berkeley Laboratory. The general topics covered included nuclear waste isolation, geophysics and reservoir engineering, and geosciences. For individual titles, see N83-24934 through N83-24992.

N83-24934# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOLOGIC SYSTEMS AS ANALOGS FOR LONG-TERM RADIOACTIVE WASTE ISOLATION: INTRUSIVE-ROCK/COUNTRY-ROCK CONTACT ZONES **c73**
H. Wollenberg, D. Brookins (New Mexico Univ.), L. Cohen (California Univ.), S. Flexser, M. Abashian (New Mexico Univ.), and M. Shea *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 5-8 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Selected natural occurrences of minerals and rocks containing radioelements and fission-product elements can be considered as analogs of sites for geologic disposal of nuclear waste. They can be studied to ascertain how radionuclides and their daughter elements might migrate from sites of origin in response to long-term natural processes: heating due to an igneous intrusion; circulation through hydrothermal systems; diffusion through the rock matrix; and weathering and erosion. Initial investigations have covered two quite different potential geologic analogs of nuclear waste isolation: (1) migration around the Bryan-Eldora stock in Colorado; and (2) migration away from the vein deposit of radioactive minerals at Marysvale, Utah. The Eldora and Marysvale studies test the concept of waste disposal in basement rocks under conditions more extreme than those proposed for nuclear waste disposal; both studies strongly suggest the feasibility of storage in basement rocks. DOE

N83-24935# California Univ., Berkeley. Lawrence Berkeley Lab.
IRON-NICKEL ALLOYS AS CANISTER MATERIAL FOR RADIOACTIVE WASTE DISPOSAL IN UNDERGROUND REPOSITORIES **c73**
J. A. Apps *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 8-11 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Canisters containing high-level radioactive waste must retain their integrity in an underground waste repository for at least one thousand years after burial (Nuclear Regulatory Commission, 1981). Since no direct means of verifying canister integrity is plausible over such a long period, indirect methods must be chosen. A persuasive approach is to examine the natural environment and find a suitable material which is thermodynamically compatible with the host rock under the environmental conditions with the host rock under the environmental conditions expected in a waste repository. Several candidates have been proposed, among them being iron-nickel alloys that are known to occur naturally in altered ultramafic rocks. The following review of stability relations among iron-nickel alloys below 3500 C is the initial phase of a more detailed evaluation of these alloys as suitable canister materials. DOE

N83-24936# California Univ., Berkeley. Lawrence Berkeley Lab.
COUPLED HYDROLOGIC-THERMOMECHANICAL EXPERIMENTS FOR RADIOACTIVE WASTE ISOLATION **c73**
G. Korbin, H. Wollenberg, B. Strisower, C. R. Wilson, and T. Chan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 11-14 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Plans for an underground research facility were formulated, incorporating techniques to assess the hydrologic and thermomechanical response of a rock mass to the introduction and long-term isolation of radioactive waste and to assess the effects of excavation on the hydrologic integrity of a repository and its

subsequent backfill, plugging, and sealing. In this report we summarize the conceptual design of the hydrologic-thermomechanical experiment to be conducted in the research facility. DOE

N83-24937# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMAL IMPACT OF WASTE EMPLACEMENT AND SURFACE COOLING ASSOCIATED WITH GEOLOGIC DISPOSAL OF NUCLEAR WASTE **c73**
S. Y. Wang, D. C. Mangold, R. K. Spencer, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 15-17 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The age of nuclear waste, the length of time between its removal from the reactor cores and its emplacement in a repository, is a significant factor in determining the thermal loading of a repository. The surface cooling period as well as the density and sequence of waste emplacement affects both the near-field repository structure and the far-field geologic environment. To investigate these issues, a comprehensive review was made of the available literature pertaining to thermal effects and thermal properties of mined geologic repositories. This included a careful evaluation of the effects of different surface cooling periods of the wastes, which is important for understanding the optimal thermal loading of a repository. The results led to a clearer understanding of the importance of surface cooling in evaluating the overall thermal effects of a radioactive waste repository. The principal findings from these investigations are summarized in this paper. DOE

N83-24938# California Univ., Berkeley. Lawrence Berkeley Lab.
BASIS FOR A TENTATIVE THERMOHYDROLOGIC CRITERION FOR EMPLACEMENT DENSITY IN A NUCLEAR WASTE REPOSITORY **c73**
J. S. Y. Wang, D. C. Mangold, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 18-21 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Thermal loading is a principal consideration in the design and evaluation of a repository for geologic disposal of nuclear wastes. Existing criteria are based on thermomechanical stability considerations for the waste package and the repository structural components as well on the allowable surface uplift due to thermal expansion of the surrounding rock medium. The vertical buoyancy flow from the repository to the surface has not been considered as a boundary criterion in the determination of repository loading densities. In this synopsis we discuss a generic thermohydrologic criterion to directly address the issue of thermal impacts on groundwater movement and radionuclide transport. DOE

N83-24939# California Univ., Berkeley. Lawrence Berkeley Lab.
THEORETICAL MODEL OF FLUID FLOW THROUGH A DEFORMABLE ROCK FRACTURE **c43**
Y. W. Tsang and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 22-23 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A simple theoretical model was developed to understand the effect of normal stress on flow through a single rough-walled fracture. In order to gain a fundamental understanding of the problem, several simplifying physical assumptions were made. Arbitrary fitting parameters were excluded. DOE

N83-24940# California Univ., Berkeley. Lawrence Berkeley Lab.
POROUS MEDIA EQUIVALENT FOR A NETWORK OF DISCONTINUOUS FRACTURES **c46**
J. C. S. Long *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 24-27 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

One of the important questions that arises when considering the flow of fluids through a discontinuous rock mass is whether the fracture network behaves as a porous medium. The work that has been done to determine the equivalent permeability of fractured rocks from information on fracture geometry (assuming an impermeable matrix) can be classified into the categories. Most of the work falls into the category in which fractures are assumed to be continuous, or of infinite extent (extensive fractures). Very little work has been done in the category in which fractures are assumed to be discontinuous, or of finite extent. It can be seen in the field that fractures are clearly of finite dimensions. The fact that fractures are finite means that each fracture can contribute to the permeability of the rock only insofar as it intersects other conducting fractures. In the extreme, an isolated fracture which does not intersect any other fracture effectively contributes nothing to the permeability of the total rock mass. This means that flow in any given fracture is not independent of flow in every other fracture. DOE

N83-24941# California Univ., Berkeley. Lawrence Berkeley Lab.
DETERMINING SIZE AND INTERCONNECTION OF FRACTURES FROM CONSTANT-HEAD WELL TESTS **c46**
T. Doe and H. Endo *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 28-31 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The ability of low-permeability rock to transmit water is determined by the interconnection of the fractures in the rock. The degree of interconnection is related to the basic geometric parameters of the fracture system orientation, aperture, density (number of fractures per unit volume), and fracture area. The purpose of this program was to see if information on the areas, apertures, and interconnections of fractures could be obtained from well tests. Although the thrust of the work was toward single fracture tests, the results are applicable to test zones containing several fractures, as one should expect that the largest fracture in any given test zone will dominate the test behavior. A further objective was to see if conventional radial-flow well-test solutions could be applied to rock in which the flow conduits are finite fractures. DOE

N83-24942# California Univ., Berkeley. Lawrence Berkeley Lab.
DEVELOPMENT OF A COUPLED THERMAL-HYDRAULIC-MECHANICAL FINITE-ELEMENT MODEL FOR SATURATED FRACTURED POROUS MEDIA **c46**
J. Noorishad, J. S. Y. Wang, C. F. Tsang, and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 31-34 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Investigtions over the past decade at the University of California, Berkeley, and Lawrence Berkeley Laboratory have led to the development of numerical models capable of analyzing the coupled hydraulic-mechanical behavior of rock masses. Employing the most recent results it is now possible to investigate the coupled hydromechanical response of saturated fractured porous rocks subject to fluid-flow or structural-load boundary conditions. Recent concerns about the safe disposal of radioactive wastes in geologic systems calls for simultaneous consideration of hydromechanical, hydrothermal, and thermomechanical effects in the designs of selected repositories. In view of this fact, and as a natural outgrowth of earlier studies, work has been underway to develop an approach to the thermal-hydraulic-mechanical behavior of fractured rocks. The essential features of this coupled finite-element method are presented. DOE

N83-24943# California Univ., Berkeley. Lawrence Berkeley Lab.
ASSESSMENT AND EVALUATION OF ENGINEERING OPTIONS AT A LOW-LEVEL RADIOACTIVE WASTE STORAGE SITE **c73**
B. Y. Kanehiro and V. Guvanasen *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 35-38 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Solutions to hydrologic and geotechnical problems associated

with existing disposal sites were sought and the efficiency of engineering options that were proposed to improve the integrity of such sites were evaluated. The Weldon Spring site is generally like other low-level nuclear waste sites, except that the wastes are primarily in the form of residues and contaminated rubble from the processing of uranium and thorium ores rather than industrial isotopes or mill tailings. DOE

N83-24944# California Univ., Berkeley. Lawrence Berkeley Lab.
VERIFICATION AND IMPROVEMENT OF A PREDICTIVE MODEL FOR RADIONUCLIDE MIGRATION **c43**
C. W. Miller, L. V. Benson, and C. L. Carnahan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 38-41 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Prediction of the rates of migration of contaminant chemical species in groundwater flowing through toxic waste repositories is essential to the assessment of a repository's capability of meeting standards for release rates. A large number of chemical transport models, of varying degrees of complexity, were devised for the purpose of providing this predictive capability. In general, the transport of dissolved chemical species through a water-saturated porous medium is influenced by convection, diffusion/dispersion, sorption, formation of complexes in the aqueous phase, and chemical precipitation. The reliability of predictions made with the models which omit certain of these processes is difficult to assess. A numberical model, CHEMTRN, was developed to determine which chemical processes govern radionuclide migration. CHEMTRN builds on a model called MCCTM developed previously by Lichtner and Benson. DOE

N83-24945# California Univ., Berkeley. Lawrence Berkeley Lab.
URANIUM DISEQUILIBRIUM MEASUREMENTS ON GROUNDWATERS **c43**
M. C. Michel and W. R. Keyes *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 42-44 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Among its other uses, the naturally occurring disequilibrium between U234 and U238 in most groundwaters was suggested as a method of determining the age of such waters. This method is applicable to ages within the range of the half-life of U234 (about 250,000 yr) and is therefore of interest in assessing sites for nuclear waste repositories. As with other suggested methods for groundwater dating, interpretation of the data raises issues that relate to the complexity of the system as well as to our imperfect knowledge of the mechanisms involved in the basic geochemical constraints on the system. The understanding of the mechanisms by which U234 is enriched or depleted in groundwaters and to develop the necessary analytical techniques for studying these processes was analyzed. Special emphasis was given to techniques that are applicable to likely nuclear waste repository sites - i.e., where water flows are low, rocks are impermeable, and recovery of samples is difficult. DOE

N83-24946# California Univ., Berkeley. Lawrence Berkeley Lab.
URANIUM (VI) RETARDATION MECHANISMS **c73**
R. J. Silva and A. W. Yee *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 45-47 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The solubility of hexavalent uranium, UO2(2), was measured as a function of pH (5 to 10), NaCl supporting electrolyte concentration (0.01 M and 0.1 M NaCl), and equilibration time in batch experiments. Dilute hydrochloric acid solutions of UO2(2) were titrated to the various pH values with NaOH. The solid which precipitated from the supersaturated solution was presumably uranyl hydroxide. DOE

N83-24947# California Univ., Berkeley. Lawrence Berkeley Lab.
SORPTIVE DIFFUSION IN CLAY GELS **c73**
J. A. Apps and C. J. Radke *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 48-49 ref (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Additional protection for the underground storage of high-level nuclear wastes can be provided by an engineered barrier or backfill material. If properly designed, such a barrier can significantly retard the migration of toxic ions even after failure of the waste canister. The backfill material should be inexpensive, relatively impermeable, thermally stable, highly sorptive to toxic ions, compatible with the host rock, easily applied, and, if possible, a fissure sealant. One material that apparently meets most of these qualifications is a swelling clay known as smectite or montmorillonite. Experimental investigation of the migration of representative nuclides in swollen clay gels and formulation of a quantitative transport model allowing reliable design of such an engineered barriers was conducted. Author

N83-24948# California Univ., Berkeley. Lawrence Berkeley Lab.
INVESTIGATION OF SILICATE SURFACE CHEMISTRY AND REACTION MECHANISMS ASSOCIATED WITH MASS TRANSPORT IN GEOLOGIC MEDIA **c46**
A. F. White and D. L. Perry *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 50-52 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The concentration and rate of transport of radionuclides through geologic media is strongly influenced by the extent of sorption on aquifer surfaces. Over time intervals relevant to such transport processes, rock and mineral surfaces are not considered as inert, unreactive substrates but rather as groundwater/solidphase interfaces which are commonly in a state of natural or artificially induced disequilibrium. The type of water/rock interactions that will infuence surface chemistry and hence sorption characteristics and capacities or natural aquifiers are defined experimentally. A wide range of silicate minerals was selected to represent rock-forming minerals in basalt, tuff, and granite. The minerals include K-feldspar, plagioclase feldspar, olivine, hornblende, biotite, and volcanic glass. DOE

N83-24949# California Univ., Berkeley. Lawrence Berkeley Lab.
RESEARCH ON NUCLEAR WASTE ISOLATION AT STRIPA: AN OVERVIEW **c73**
P. A. Witherspoon, N. G. W. Cook, J. E. Gale, and C. R. Wilson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 53-55 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A principal attribute of deep geologic disposal of radioactive waste is the high degree of physical protection it provides against human intrusion and natural events. However, even in a geologically suitable area, transport to the biosphere may occur through groundwater. There are, therfore, a number of attributes that any site should have: low permeability, low interconnected porosity, low hydraulic gradient, and high sorptive capacity. Heat generated by the waste introduces the additional requirements of chemical and mechanical stability. To assess the ability of a rock mass to isolate waste, new experimental techniques and analytical procedures must be developed to improve understanding of rock mass behavior and transport in slowly moving groundwaters. Over the past several years, thermomechanical, hydrological, and geochemical investigations were conducted by Lawrence Berkeley Laboratory in a fractured quartz monzonite rock at a depth of some 340 m in a worked-out iron ore mine at Stripa in Sweden. DOE

N83-24950# California Univ., Berkeley. Lawrence Berkeley Lab.
RADIOGEOLOGIC ASSESSMENT FOR NUCLEAR WASTE ISOLATION: STUDIES OF THE STRIPA PLUTON **c73**
H. Wollenberg, S. Flexser, and L. Andersson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 56-58 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

To properly characterize candidate sites for radioactive waste

isolations, it is necessary to obtain a good understanding of their radiogeologic settings. The distribution and abundance of the naturally occurring radioelements - U238, the 232, their daughters, and both in the rock mass encompassing the repository and in the neighboring rocks - constitute the baseline upon which the effects of the radioactive waste are superimposed. The distribution of these radioelements is also a good indicator of the geochemical homogeneity of the rock mass. At the Stripa experimental facility in an inactive iron mine, radiogeologic studies included gamma-spectrometric surveys, on the surface and underground, of the U, Th, and K contents of the quartz monzonite pluton encompassing the experiments, the high-grade metamorphic rocks surrounding the pluton, and the neighboring larger granitic plutons. The gamma-spectral surveys were calibrated by laboratory analyses of hand specimens and drill cores, permitting calculation of radioelement concentrations from field counting rates. DOE

N83-24951# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMOMECHANICAL PROPERTIES OF STRIPA GRANITE **c46**

L. Myer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 58-61 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The Stripa material properties testing program was initiated to study, by laboratory testing, the thermomechanical behavior of the Stripa rock mass and to provide material properties for input into numerical programs for simulation of the in situ heater experiments at Stripa. Measurement of elastic moduli and coefficients of thermal expansion of dry, intact samples of Stripa granite was completed in fiscal year 1980. A summary of the most significant findings resulting from tests on six samples are presented. DOE

N83-24952# California Univ., Berkeley. Lawrence Berkeley Lab.
ANALYSIS OF TEMPERATURE DATA FROM THE FULL-SCALE HEATER EXPERIMENTS AT STRIPA **c46**

I. Javandel and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 61-64 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The thermomechanical behavior of deeply fractured crystalline rock when it is used for the isolation of high-level nuclear waste was examined, and a series of experiments was conducted in deep granitic rock at Stripa, Sweden, in a site adjacent to an abandoned iron mine. Among these experiments were two full-scale heating experiments carried out at a depth of approximately 340 m. These experiments were designed to study the near-field effects of heating the rock at two different thermal power levels, with electrical heaters substituting for nuclear waste canisters. Later, one of these experiments was supplemented by eight peripheral heaters to account for the interaction of surrounding waste canisters. DOE

N83-24953# California Univ., Berkeley. Lawrence Berkeley Lab.
ROD-TYPE EXTENSOMETERS IN LONG-TERM ELEVATED TEMPERATURE SERVICE **c46**

A. O. DuBois, P. H. Nelson, M. Hood, and E. Binnall *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 65-68 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

At Stripa, Sweden, 35 rod type extensometers were used to measure displacements within the granite rock mass surrounding electrical heaters emplaced in the floor of an underground entry. The performance of currently available rock instrumentation when subjected to long term service at elevated temperatures are thermomechanically evaluated. DOE

N83-24954# California Univ., Berkeley. Lawrence Berkeley Lab.
DETERMINATION OF THE STATE OF STRESS AT THE STRIPA MINE, SWEDEN **c46**

T. Doe *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 69-71 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The state of stress at the Stripa mine was determined. The goals of the Stripa stress measurement program are twofold: (1) to provide in situ stress data for the analysis of the thermomechanical and hydrologic measurements at the site, and (2) to compare the results of hydraulic fracturing with a variety of overcoring techniques at a common site. DOE

N83-24955# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOPHYSICAL BOREHOLE MEASUREMENTS IN LOW-PERMEABILITY ROCK **c46**

P. H. Nelson and R. Rachiele *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 72-75 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Permeability variations inferred from geophysical logs by simple inspection and correlation are compared with hydrologic permeability determinations. A new method permeability profiling is illustrated by flow logs obtained with dissolved radon, a naturally occurring radioactive tracer. The 3-in. diameter boreholes were logged with geophysical probes before permeability determined with injection methods on intervals isolated with packers. DOE

N83-24956# California Univ., Berkeley. Lawrence Berkeley Lab.
DEVELOPMENT, VERIFICATION, AND APPLICATION OF MODELING TECHNIQUES FOR THERMOMECHANICAL ANALYSIS **c46**

T. Chan and E. L. Wilson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 75-78 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The thermomechanical response of a granitic rock mass was tested by Stripa heating. Preliminary linear thermoelastic calculations using constant rock properties measured from one or two small specimens did not agree with field data. A project was established to develop improved analytical and numerical models to simulate thermally induced rock deformations and stresses. The status of model development, verification, and application are summarized. DOE

N83-24957# California Univ., Berkeley. Lawrence Berkeley Lab.
MEASUREMENT OF LOW RATES OF WATER INFLOW BY MONITORED EVAPORATION IN THE LARGE-SCALE PERMEABILITY EXPERIMENT AT STRIPA **c46**

M. J. McPherson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 79-82 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The low rates of water inflow to the heading used for the large scale permeability experiment at Stripa were analyzed by monitoring the water vapor content of the ventilation air. Coupled with measurements of water pressure in sealed sections of boreholes, the data evaluate the macropermeability of the fractured granite around the heading. Transient effects on the apparent water inflow were noted after changes in the room temperature or airflow which were caused by mixing processes within the room and self correcting variations in the rate of evaporation from the rock walls. The results of moisture pickup and the time transients which occur during the course of the experiment are examined. DOE

N83-24958# California Univ., Berkeley. Lawrence Berkeley Lab.
ELECTROMAGNETIC MODELING USING A FAST NUMERICAL SOMMERFELD INTEGRAL **c46**

K. H. Lee and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 85-86 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The application of electromagnetic techniques in the search for anomalously conductive structures in the earth requires a rapid calculation of the response of three dimensional bodies to dipole

and plane wave fields is discussed. In the integral equation modeling technique, as in other useful techniques, a great number of Green's functions of the Sommerfeld integral type must be numerically computed. Such integrals are evaluated primarily by a Gaussian quadrature integration technique, the convergence of which can be accelerated using Euler's transformation. A numerical convolution or digital filter technique for calculating various Green's function was developed. The method avoids the evaluation of the Bessel function and is an order of magnitude faster than the Gaussian quadrature technique. DOE

N83-24959# California Univ., Berkeley. Lawrence Berkeley Lab.
AN INFERRED CONDUCTIVITY DISTRIBUTION IN THE VICINITY OF MOUNT HOOD, OREGON, BASED ON THE INTERPRETATION OF MAGNETOTELLURIC AND TELLURIC DATA **c46**
E. C. Mozley and N. E. Goldstein *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 86-88 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Magnetotelluric and telluric measurements were acquired in the vicinity of Mount Hood, Oregon, to evaluate the geothermal potential of this stratovolcano located in the High Cascade Range of northern Oregon. The area is characterized by rugged topography ranging from deeply eroded valleys surrounding the volcano, with elevations as low as 2000 ft, to the volcanic peak with a elevation of 11,235 ft. Four stations obtain simultaneously a five component magnetotelluric measurement supplemented by two remote telluric vector measurements and one remote two component magnetic measurement. The data are processed by the auto power and cross spectral estimates obtained through fast Fourier transform algorithm. DOE

N83-24960# California Univ., Berkeley. Lawrence Berkeley Lab.
IN-FIELD PROCESSING AND MAGNETOTELLURICS WITH THE EM-60 ELECTROMAGNETIC SYSTEM **c46**
M. Wilt, N. E. Goldstein, J. R. Haught, V. Labson, and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 88-90 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The EM-60 electromagnetic system for use in intermediate depth geothermal exploration was investigated. This system is used for geothermal exploration and crustal studies and is proven to be effective even in areas of complex geology or rugged local terrain. The EM-60 system allows for infield data processing and on site calculation of apparent resistivity. The modified system allows for the possibility of simultaneous measurements of controlling source (dipole) electromagnetic and magnetotelluric (MT) soundings. DOE

N83-24961# California Univ., Berkeley. Lawrence Berkeley Lab.
DEEP ELECTROMAGNETIC SOUNDING IN THE BASIN AND RANGE PROVINCE **c46**
M. Wilt, N. E. Goldstein, J. R. Haught, and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 90-91 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A deep electromagnetic (EM) sounding survey was undertaken in the northern Basin and Range Province. The purposes were: (1) to confirm the presence of deep conductive bodies first detected with a magnetotelluric measurements; (2) to investigate the geometry of these bodies; and (3) to test the source EM system (EM-60) as modified to perform deep sounding work. It is found that the deeply buried conductors may have important tectonic implications; if they consist of partially molten rock, they could be the heat source of the numerous hot springs and geothermal systems in northern Nevada. DOE

N83-24962# California Univ., Berkeley. Lawrence Berkeley Lab.
SIMPLE ONE-DIMENSIONAL INVERSIONS OF MAGNETOTELLURIC DATA **c46**
W. M. Goubau *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 92-95 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The exact solution to the one dimensional inverse problem in magnetotellurics was first derived by Weidelt. Often it is much more desirable to find an approximate inverse that can be computed rapidly. Bostick's algorithm is concise enough that it can be evaluated with a pocket calculator, and in many cases it yields an inverse that reflects all of the essential features of the true inverse. Alternative inversion schemes that are derived from Maxwell's equations are presented. DOE

N83-24963# California Univ., Berkeley. Lawrence Berkeley Lab.
THE APPLICATION OF ASP: AN AUTOMATED SEISMIC PROCESSOR **c46**
E. L. Majer and T. V. McEvilly *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 95-98 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The seismographic station of the University of California, Berkeley, and Lawrence Berkeley Laboratory are developing an in-field, lower-power, processor for microearthquake data. The objective is to utilize CMOS microprocessor technology (RCA 1802) to automate the routine, labor-intensive processing of microearthquake survey data. The Automated Seismic Processor (ASP) is presently set up to handle 15 channels of data, although the system is configured for up to 128 channels. A WORKER computer on each channel automatically detects P- and S-waves, measures their arrival times and amplitudes, and computes and fits FFT's for both waves on data sampled at 100 samples/s. These data from each channel are then processed with a central microprocessor (the BOSS) for hypocenter location, running b-values, source parameters, event count, and P-wave polarities. The system is capable of processing a 15-station detection in approximately 40 s, excluding printout. The initial trials have demonstrated than in-field, real-time analysis of data maximizes the efficiency of microearthquake surveys, allowing flexibility in experimental procedures with a minimum of the traditional labor-intensive postprocessing. DOE

N83-24964# California Univ., Berkeley. Lawrence Berkeley Lab.
ADVANCES IN TRANSIENT WELL-TESTING METHODOLOGY **c46**
C. W. Miller, S. M. Benson, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 99-102 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A major problem in determining the transmissivity and storativity of a geothermal reservoir is that in most cases the flow in the reservoir is two-phase. Conventional well-test methods are primarily applicable to isothermal, single-phaser reservoirs. The effects of two-phase well-bore flow on pressure transient tests were investigated and appropriate testing and analysis procedures were determined. Analysis methods for injection tests data in a fractured two-phase reservoir were also studied. DOE

N83-24965# California Univ., Berkeley. Lawrence Berkeley Lab.
LOW- TO MODERATE-TEMPERATURE HYDROTHERMAL RESERVOIR ENGINEERING RESEARCH **c46**
S. M. Benson, R. Solbau, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 102-104 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A computational model for thin fault-charged hydrothermal reservoirs, well-testing instrumentation, case studies of low- to moderate-temperature reservoirs are discussed. DOE

N83-24966# California Univ., Berkeley. Lawrence Berkeley Lab.
EVALUATION OF THE HYDROTHERMAL POTENTIAL OF THE ASHDOD AREA, ISRAEL **c43**
S. M. Benson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation,

Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 105-107 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A project to evaluate the hydrothermal potential in and around Ashdod, Israel is discussed. The US Agency for International Development (AID) is evaluating the hydrothermal potential of this area because a sea water desalination plant being constructed in Ashdod will have large requirements for a low-grade heat source. The objective of this evaluation is to determine if the hydrothermal resource at Ashdod is of suitable temperature, brine chemistry, size, and productivity to economically replace the existing heat source for the plant. It is estimated that approximately 2100 m(3)/hr of 95 C brine will be required to replace the existing heat source. DOE

N83-24967# California Univ., Berkeley. Lawrence Berkeley Lab.
THE BACA DEMONSTRATION PROJECT **c44**
G. S. Bodvarsson, M. Wilt, J. Delany, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 108-110 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The Baca geothermal field is located in the Valles Caldera, New Mexico, approximately 55 miles north of Albuquerque. The field is being developed for 50 MWe power production. To date, 24 wells have been drilled in the Redondo Creek area in the western part of the caldera. This year's activities and the pesent status of the Baca project are described. DOE

N83-24968# California Univ., Berkeley. Lawrence Berkeley Lab.
INJECTION OF COLD WATER INTO GEOTHERMAL RESERVOIRS **c44**
G. S. Bodvarsson, C. F. Tsang, K. Pruess, and M. J. OSullivan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 110-113 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Reinjection of geothermal wastewater is gradually becoming a preferred means of waste disposal. The increasing interest in reinjection undoubtedly results from growing environmental concerns regarding toxic minerals (e.g., boron, arsenic) present in geothermal wastewater. The advancement of the thermal front during injection into a fractured reservoir system is discussed. The system under consideration consists of equally spaced horizontal fractures intersecting an injection well. Analytical and numerical studies were designed to address the important question of how fractures affect the movement of the thermal front during injection. DOE

N83-24969# California Univ., Berkeley. Lawrence Berkeley Lab.
MODELING OF FRACTURE RESERVOIRS **c43**
K. Pruess, T. N. Narasimhan, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 113-115 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Most geothermal reservoirs are highly fractured systems. The fractures provide conduits through which fluid (and heat) can flow at rates which are sufficiently large to be of commercial interest. Traditional approaches to geothermal reservoir evaluation and analysis have employed a porous medium approximation, which amounts to assuming instantaneous (thermal and hydrologic) equilibrium between fractures and matrix. A new numerical modeling technique, termed the multiple interacting continua method (MINC), was developed which treats transient fluid and heat flow within the matrix and fractures. DOE

N83-24970# California Univ., Berkeley. Lawrence Berkeley Lab.
GENERIC STUDIES OF GEOTHERMAL RESERVOIR BEHAVIOR **c44**
K. Pruess, G. S. Bodvarsson, M. J. Lippmann, and A. H. Truesdell (U.S. Geological Survey) *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 115-118 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The characteristics and behavior of geothermal reservoirs are often strongly influenced by geologic and hydrologic conditions that are peculiar to a given site. Site-specific detail can render a reservoir description and analysis so complex that it becomes difficult to identify the important physical mechanisms and parameters which govern reservoir behavior. Some important insight into the evolution of geothermal reservoirs under natural or man-made conditions can be gained from a study of schematic, idealized representations of such reservoirs. Generic studies are particularly useful for two-phase geothermal reservoirs with coexisting water and steam. The presence of two phases with different densities and heat contents can give rise to peculiar and sometimes surprising phenomena, which can be conveniently explored by means of computer simulation. Two such simulation studies are summarized. One addresses the problem of natural evolution of geothermal reservoirs over geologic time; the other examines energy recovery and reservoir longevity for different completion depths of production wells. DOE

N83-24971# California Univ., Berkeley. Lawrence Berkeley Lab.
SUBSIDENCE MODELING OF THE PLEASANT BAYOU GEOTHERMAL GEOPRESSURED REGION **c46**
K. P. Goyal, T. N. Narasimhan, and S. P. VonderHaar *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 118-121 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The pleasant Bayou prospect, a geothermal geopressured area, is located in Brazoria County, Texas. Deltaic sandstones of the Frio Formation, at a depth of about 14,000 ft (4.27 km), are found to have potential for a geothermal geopressured reservoir. Two exploratory wells were drilled by the US Department of Energy (DOE), with a separation of 500 ft. The Pleasant Bayou area is part of a deep sedimentary basin traversed by growth faults. For purposes of subsidence modeling, a circular area with a radius of 5 miles and centered at the DOE wells is considered. DOE

N83-24972# California Univ., Berkeley. Lawrence Berkeley Lab.
FLUID SAMPLING AND ANALYSIS OF GEOPRESSURED BRINE **c46**
L. Hansen, R. M. Galbraith, O. Weres, M. C. Michel, and D. Sverjensky *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 122-124 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Economic assessment of the low-temperature geopressured brines found in certain Gulf Coast formations requires knowledge of their methane content and a clear understanding of their geochemistry. A downhole fluid sampler designed to operate under the pressures, temperatures, and chemical conditions that prevail in geopressured zones was fabricated and tested. Additionally, through the use of brine modeling codes, the chemical problems associated with production and disposal of geopressured fluids were studied. DOE

N83-24973# California Univ., Berkeley. Lawrence Berkeley Lab.
SIMULATION OF THERMAL ENERGY STORAGE IN A DOUBLET WELL SYSTEM **c44**
T. A. Buscheck, C. Doughty, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 124-125 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A numerical simulation based on the field operating conditions was used to test experimenters' understanding of the aquifer storage problem and to validate the numerical model CCC. In the Mobile experiment, 25,000 cubic meters of water of approximately 55 to 600 C was injected over a period of one month into an aquifer that is approximately 21 m thick, has a permeability of about 63 d and was initially at 200 C. It was then stored for one month and subsequently produced. DOE

N83-24974# California Univ., Berkeley. Lawrence Berkeley Lab.
A DIMENSIONLESS PARAMETER APPROACH TO THE THERMAL BEHAVIOR OF AN AQUIFER THERMAL ENERGY STORAGE SYSTEM **c44**
C. Doughty, G. Hellstrom (Lund Inst. of Technology), C. F. Tsang, and J. Claesson (Lund Inst. of Technology) *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 126-128 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The purpose of aquifer thermal energy storage (ATES) site-characterization studies is to develop a general procedure whereby the energy recovery factor for a given site may be predicted readily for a wide range of operating conditions without doing detailed numerical simulations. The thermal behavior of a ATES system with steady radial fluid flow around a single injection/production well is discussed. Buoyancy flow is neglected, and the aquifer is confined above and below by impermeable confining layers. DOE

N83-24975# California Univ., Berkeley. Lawrence Berkeley Lab.
THE CHARACTERIZATION OF HEAT STORAGE IN CONFINED AQUIFERS WITH BUOYANCY FLOW **c44**
T. A. Buscheck and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 128-129 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

In order to develop a graphical means of estimating the energy recovery performance of a proposed storage aquifer, including buoyancy effects, numerical simulations were conducted over a wide range of aquifer permeabilities and injection temperatures using the numerical model CCC, which takes into account temperature-dependent parameters and the buoyancy flow process. DOE

N83-24976# California Univ., Berkeley. Lawrence Berkeley Lab.
A COMPARATIVE STUDY OF FOUR MAJOR APPROACHES TO PREDICTING ATES PERFORMANCE **c44**
C. Doughty, T. A. Buscheck, G. S. Bodvarsson, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 129-132 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The International Energy Agency test problem involving Aquifer Thermal Energy Storage was solved using four approaches: the numerical model PF (formerly CCC), the simpler numerical model SFM, and two graphical characterization schemes. Each of the four techniques, with the advantages and disadvantages of each, are discussed. DOE

N83-24977# California Univ., Berkeley. Lawrence Berkeley Lab.
OVERVIEW OF THE MEXICAN-AMERICAN COOPERATIVE PROGRAM AT THE CERRO PRIETO GEOTHERMAL FIELD **c44**
M. J. Lippmann and R. Zelwer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 133-138 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The Lawrence Berkeley Laboratory is coordinating the US technical activities being carried out at Cerro Prieto under a five-year agreement between the US Department of Energy and the Comission Federal de Electricidad de Mexico. This agreement, signed in July 1977, is expected to expire in July 1982. Efforts are being made to continue some of the research beyond the formal termination of the agreement. A description of the program, which involves studies of geology, geophysics, hydrodynamics, subsidence, geothermal wells and reservoirs, and aquifers, is discussed. DOE

N83-24978# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOLOGIC MODEL OF THE CERRO PRIETO GEOTHERMAL FIELD **c46**
S. E. Halfman, J. H. Howard, and S. P. VonderHaar *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 138-141 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

One of the tasks under the Mexican-American cooperative agreement is the comprehensive geologic study of the Cerro Prieto geothermal field. Using logs from over seventy deep wells as the basic source of information on the subsurface geology, a working model of the Cerro Prieto geothermal field is developed. DOE

N83-24979# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOPHYSICAL MONITORING AT THE CERRO PRIETO GEOTHERMAL FIELD **c46**
M. Wilt, R. Zelwer, and E. L. Majer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 141-144 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A program of reservoir monitoring at the Cerro Prieto geothermal field using surface geophysical methods with the objective of observing changes resulting from production is described. The three methods used, dipole-dipole resistivity, precision gravity, and passive seismic monitoring, are discussed. DOE

N83-24980# California Univ., Berkeley. Lawrence Berkeley Lab.
RESERVOIR ENGINEERING STUDIES OF THE CERRO PRIETO GEOTHERMAL FIELD **c46**
K. P. Goyal, M. J. Lippmann, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 144-147 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Reservoir engineering studies of the Cerro Prieto geothermal field began in 1978 under a five-year cooperative agreement between the US Department of Energy and the Comision Federal de Electricidad de Mexico, with the ultimate objective of simulating the reservoir to forecast its production capacity, energy longevity, and recharge capability under various production and injection scenarios. During the fiscal year 1981, attempts were made to collect information on the evolution history of the field since exploitation began; the information is to be used later to validate the reservoir model. To this end, wellhead production data were analyzed for heat and mass flow and also for changes in reservoir pressures, temperatures, and saturations for the period from March 1973 to November 1980. DOE

N83-24981# California Univ., Berkeley. Lawrence Berkeley Lab.
THE BEHAVIOR OF ROCK-FLUID SYSTEMS AT ELEVATED TEMPERATURES AND PRESSURES **c46**
W. H. Somerton *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 151-152 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Data on the following properties of rock-fluid systems are given: deformation properties, including pore and bulk compressibilities and thermal expansions; P- and S-wave velocities; absolute permeability; electrical resistivity factor; and thermal properties, including conductivity, diffusivity, and specific heats. Work accomplished during the past year in two areas (modeling of pore and bulk compressibilities and thermal expansions, and measurements of electrical resistivity factors at elevated temperatures) is reviewed. DOE

N83-24982# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMODYNAMICS OF HIGH-TEMPERATURE BRINES **c77**
K. S. Pitzer, P. S. Z. Rogers, and J. C. Peiper *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 152-154 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Current interest in a variety of geochemical phenomena, including geothermal and geopressurized brines, has focused

attention on the importance of a model for aqueous solution properties at high temperatures and pressures. The number of different brines encountered is large, hence obtaining detailed measurements on each of them is impractical. A model was needed that would be capable of predicting the properties of complex brines yet be based on a minimum amount of experimental data on a few key systems. Thus a program was begun in 1975 to study the solution thermodynamics of brine systems, including both modeling and experimental work. DOE

N83-24983# California Univ., Berkeley. Lawrence Berkeley Lab.
PRELIMINARY DETERMINATION OF THE Al(OH) SUB 4 STABILITY CONSTANTS IN THE AQUEOUS PHASE AT ELEVATED TEMPERATURES **c25**
J. M. Neil and J. A. Apps *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 155-157 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

One of the benefits to be gained from measuring the solubilities of major rock-forming minerals in the aqueous phase at elevated temperatures is the opportunity of testing thermochemical models describing aqueous interactions. The refinement of such models is an important step in interpreting geochemical reactions taking place during diagensis, metasomatism, and metamorphism. Comparison between measured solubilities and the solubilities projected from calorimetric data serves to identify either data base or model errors, which become the departure point for further research. One source of error is the uncertainty about the species of aluminum in solution at evaluated temperatures. DOE

N83-24984# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMODYNAMIC PROPERTIES OF SILICATE MATERIALS **c77**
I. S. E. Carmichael, L. K. Moret, M. L. Rivers, J. F. Stebbins, and X. Mo *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 157-159 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Measurements of the thermodynamic properties of silicate liquids and glasses are generally few in number, and yet essential if the generation of magmas at depth in the earth, their ascent toward the surface, and their ascent toward the surface, and their cooling on or near the surface are to be quantified. General geologic investigations have provided almost unlimited data on the range of compositions of natural silicate liquids, but comparatively little on the corresponding between their composition and such properties as volume, thermal expansion, compressibility, heat content, and heat capacity. It is the intent of this experimental program to remedy this situation by combining measurements of thermodynamic properties over a wide range of silicate compositions to obtain the compositional dependence of the measured property. DOE

N83-24985# California Univ., Berkeley. Lawrence Berkeley Lab.
NONEQUILIBRIUM, INTERPHASE MASS TRANSFER IN CHEMICAL TRANSPORT BY GROUNDWATER **c44**
C. L. Carnahan and J. S. Remer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 160-163 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The research described here is a part of a larger study of nonequilibrium processes in mass transport by flowing groundwater. In this phase of the work, analytical solutions are developed for convective-dispersive transport of a radioactive solute that undergoes time-dependent sorption on surfaces of the matrix supporting the flow. The rate of sorption is represented by a linear kinetic rate law, corresponding to the approximation of very low sorbate activity in the fluid phase. These solutions were derived, along with solutions for the case of equilibrium sorption, to serve as references for comparison with numerical results for transport problems using nonlinear kinetic rate laws of sorption and with more complex treatments, including effects of thermodynamic coupling of transport processes; these investigations are now in progress. DOE

N83-24986# California Univ., Berkeley. Lawrence Berkeley Lab.
CHEMISTRY OF NUCLEAR WASTE SUBSTANCES IN AQUEOUS SOLUTIONS **c73**
S. L. Phillips and A. Igbene *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 163-165 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Underground storage of nuclear wastes requires prediction of the likelihood of leaching from containers and subsequent migration of waste nuclides into natural waters. Although a great deal of information is needed, this work is limited to thermodynamic and kinetic data on metal-ion species in aqueous media. Such data are used in computer codes, Eh-ph diagrams, and other calculations of metal species at high temperatures. DOE

N83-24987# California Univ., Berkeley. Lawrence Berkeley Lab.
ENHANCED RECOVERY OF HEAVY OILS WITH ALKALI **c43**
C. J. Radke and W. H. Somerton *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 166-167 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Many oils, especially those classed as heavy oils, contain natural acids, such as alkyl and aryl carboxylics and porphyrins. In contact with aqueous alkalis, these acidic components can produce surface-active molecules that aid in oil displacement. The objective of this project is to study the fundamental mechanisms of alkali enhanced oil recovery to permit better process design. Author

N83-24988# California Univ., Berkeley. Lawrence Berkeley Lab.
THE PARTITIONING OF HYDROGEN SULFIDE IN THE CONDENSERS OF GEYSERS UNIT 15 **c46**
O. Weres *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 168-170 refs Sponsored in part by the Pacific Gas and Electric Co. (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

Geysers Unit 15 was the first of the geothermal units equipped with surface condensers to go on line at The Geysers power plant of the Pacific Gas and Electric Company. Units 1 through 12 have contact condensers. The switch to surface condensers was motivated by considerations of hydrogen sulfide mission abatement. In the contact condensers, there is a large liquid-to-vapor ratio, and about 75% of the hydrogen sulfide that is present in the geothermal steam supply ends up dissolved in the cooling water. Once in the cooling water, it is emitted to the atmosphere from the cooling towers unless further, tertiary abatement is employed. It was reasoned that, because the liquid-to-vapor ratio in a surface condenser would be smaller by a factor of about twenty-five than in a contact condenser, most of the hydrogen sulfide would remain in the vapor phase and leave with the gas vented from the condenser rather than by dissolving in the condensate. Unit 15 is equipped with a Stretford Unit, which removes the hydrogen sulfide from the vent gas and converts it to elemental sulfur by reaction with air. Therefore, the fraction of the hydrogen sulfide that leaves the condenser with the vent gas is not emitted to the atmosphere. DOE

N83-24989# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOANALYTICAL AND CHEMICAL BONDING STUDIES USING MODERN SURFACE TECHNIQUES **c46**
D. L. Perry *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 171-172 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

In the last several years, a number of new instrumental surface techniques have been developed that are quite effective in detecting changes in the surfaces of minerals that have undergone chemically induced reactions or natural geologic alteration. These

techniques are quite sensitive, and they make it possible to monitor very small amounts of elements that may be present on the mineral surfaces. Thus, any change in the surface due to chemical composition or bonding may be readily measured qualitatively and, in some cases, quantitatively. Surface measurements as part of a mineral geochemical study have several advantages. Several of the more widely used techniques are discussed below. DOE

N83-24990# California Univ., Berkeley. Lawrence Berkeley Lab.
MINE VENTILATION PLANNING: A CASE STUDY c43
M. J. McPherson and M. Hood *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 173-177 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

One of the main objectives of this work program was to investigate the benefits of employing a systems approach to ventilation design in an existing U.S. mine. Sunnyside Mine 3 in Utah has been operating continuously for more than 80 yr. It was selected for the study because its ventilation system was incapable of supplying adequate quantities of air to the working faces. Author

N83-24991# California Univ., Berkeley. Lawrence Berkeley Lab.
THE MEASUREMENT OF IN SITU STRESS USING NQR/NMR c46
E. Schempp, J. B. Murdoch, and S. M. Klainer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 177-180 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

The measurement of stress in rocks underground is a difficult but very important problem in mining engineering and in the design of underground waste repositories. The structural stability of any excavation is critically dependent on the stress distribution in the surrounding rock and its capability to bear the stress, which can build up to hundreds of atmospheres in deep mines. Because existing methods for the determination of stress have limitations, Lawrence Berkeley Laboratory (LBL) has been investigating the use of spectroscopic techniques - nuclear quadrupole resonance (NQR) and nuclear magnetic resonance (NMR) - for rapid in situ measurements of three-dimensional stress in both salt and hard rock. Efforts in the past year have been directed toward computer simulation of boreholes stress patterns and NQR lineshapes, laboratory measurements on salt and aluminosilicates, and construction of a state-of-the-art pulsed NQR spectrometer. DOE

N83-24992# California Univ., Berkeley. Lawrence Berkeley Lab.
UNIQUE DEVELOPMENTS IN LASER-INDUCED FLUORESCENCE FLUORIMETRY (LIFF) c25
S. M. Klainer, H. R. Bowman, J. Conway, T. Hirschfeld, and F. Milanovich *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 180-182 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

A new analytical technique based on laser-induced fluorescence fluorimetry (LIFF) allows the detection and quantitative measurement of a variety of species in groundwater samples through the use of fiber optics for in situ analysis and monitoring and coprecipitation methods for identification and quantification with sensitivities many orders of magnitude higher than presently achieved with other analytical methods. To date, actinides, lanthanides, fluorescent tracers, and some cations, anions, and organics have been analyzed using this method. Author

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-24993* Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
APPLICATION OF LANDSAT IMAGES TO THE MAPPING AND MANAGEMENT OF THE RANGELANDS OF THE GUNGU AREA (ZAIRE) [APPLICATION DES IMAGES LANDSAT A LA CARTOGRAPHIE ET AMENAGEMENT DES PATURAGES DE LA ZONE DE GUNGU (ZAIRE)]
Nelson de Jesus Parada, Principal Investigator and Ilunga Nday Jan. 1983 71 p refs In FRENCH; ENGLISH summary Sponsored by NASA ERTS
(E83-10300; NASA-CR-170330; NAS 1.26:170330; INPE-2621-RPE/425) Avail: NTIS HC A04 CSCL 08B

By means of manual interpretation based on tonality and texture analysis, information about burned areas, drainage, geomorphology, vegetation, and land use was obtained. These image extracted data, integrated with field collected adata and bibiliography, are relevant and well appropriate for mapping and management of pastureland. Author

N83-24994*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
PERSPECTIVES IN REMOTE SENSING IN BRAZIL. AN APPROAÇH OF THE REMOTE SENSING APPLICATIONS TO EARTH RESOURCES SURVEYS [PERSPECTIVAS EM SENSORIAMENTO REMOTO NO BRASIL. UMA ABORDAGEM DAS APLICACOES DE SENSORIAMENTO REMOTO NO LEVANTAMENTO DOS RECURSOS TERRESTRES]
Nelson de Jesus Parada, Principal Investigator and Rene Antonio Novaes Nov. 1982 12 p refs In PORTUGUESE; ENGLISH summary Presented at the 2nd Congr. Brasil. de Meteorol., Pelotas, Brazil, 1982 Sponsored by NASA ERTS
(E83-10290; NASA-CR-170323; NAS 1.26:170323; INPE-2577-PRE/225) Avail: NTIS HC A02/MF A01 CSCL 05B

Since the systematic use of earth surface data collection by orbital sensor systems started in 1972 with the launching of the North American LANDSAT satellite, a great effort has been made to assimilate, develop and transfer remote sensing technology (data acquisition and analysis) in its many applications in Brazil. The availability of sensor systems and existing data is considered approached, as well as those which will soon be available to the Brazilian researchers. The new systems of the LANDSAT-4, of the Columbia space shuttle and of the French satellites of the SPOT series are discussed. Some characteristics of the sensor system for the first Brazilian remote sensing satellite, to be launched by the end of the decade, are presented. Some LANDSAT-4 and SPOT simulation products are shown, emphasizing how the data obtained by these new satellites can be applied. Author

N83-24995*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
CALCULATIONS OF RADAR BACKSCATTERING COEFFICIENT OF VEGETATION-COVERED SOILS
Tsan Mo (Computer Sciences Corp., Silver Spring, Md.), Thomas J. Schmugge, and Thomas J. Jackson, Principal Investigators (Agricultural Research Service, Beltsville, Md.) Mar. 1983 55 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development ERTS
(Contract NAS5-24350; Proj. AgRISTARS)
(E83-10291; NASA-TM-85006; SM-G3-04400; NAS 1.15:85006) Avail: NTIS HC A04/MF A01 CSCL 17I

A model for simulating the measured backscattering coefficient of vegetation-covered soil surfaces includes both coherent and incoherent components of the backscattered radar pulses from a rough sil surface. The effect of vegetation canopy scattering is also incorporated into the model by making the radar pulse subject to two-way attenuation and volume scattering when it passes through the vegetation layer. Model results agree well with the measured angular distributions of the radar backscattering coefficient for HH polarization at the 1.6 GHz and 4.75 GHz frequencies over grass-covered fields. It was found that the coherent scattering component is very important at angles near

nadir, while the vegetation volume scattering is dominant at incident angles > 30 degrees. A.R.H.

N83-24996*# Pennsylvania State Univ., University Park. Dept. of Meteorology.
INTERACTIVE INITIALIZATION OF HEAT FLUX PARAMETERS FOR NUMERICAL MODELS USING SATELLITE TEMPERATURE MEASUREMENTS Final Report
Toby N. Carlson, Principal Investigator Oct. 1982 21 p refs ERTS
(Contract NAS5-26456)
(E83-10293; NASA-CR-170324; NAS 1.26:170324) Avail: NTIS HC A02/MF A01 CSCL 04B

A method for obtaining patterns of moisture availability (and net evaporation) from satellite infrared measurements employs Carlson's boundary layer model and a variety of image processing routines executed by a minicomputer. To test the method with regard to regional scale moisture analyses, two case studies were chosen because of the availability of HCMM data and because of the presence of a large horizontal gradient in antecedent precipitation and crp moisture index. Results show some correlation in both cases between antecedent precipitation and derived moisture availability. Apparently, regional-scale moisture availability patterns can be determined with some degree of fidelity but the values themselves may be useful only in the relative sense and significant to within plus or minus one category of dryness over a range of 4 or 5 categories between absolutely dry and field saturation. Preliminary results suggest that the derived moisture values correlate best with longer-term precipitation totals, suggesting that the infrared temperatures respond more sensitively to a relatively deep substrate layer. A.R.H.

N83-24997*# National Aeronautics and Space Administration. Earth Resources Labs., Bay St. Louis, Miss.
AN-A46. LANDSAT SCENE-TO-SCENE REGISTRATION ASSESSMENT Quarterly Report, 22 Jan.-21 Apr. 1983
James E. Anderson, Principal Investigator 21 Apr. 1983 7 p ERTS
(E83-10294; NASA-TM-85178; NAS 1.15:85178) Avail: NTIS HC A02/MF A01 CSCL 05B

Initial results obtained from the registration of LANDSAT-4 MSS data to LANDSAT-2 MSS data are documented and compared with results obtained from a LANDSAT-2 MSS-to-LANDSAT-2 MSS scene-to-scene registration (using the same LANDSAT-2 MSS data as the base data set in both procedures). RMS errors calculated on the control points used in the establishment of scene-to-scene mapping equations are compared to errors computed from independently chosen verification points. Models developed to estimate actual scene-to-scene registration accuracy based on the use of electrostatic plots are also presented. Analysis or results obtained indicates a statistically significant difference in the RMS errors for the element contribution. Scan line errors were not significantly different. It appears that a modification to the LANDSAT-4 MSS scan mirror coefficients is required to correct the situation. Author

N83-24998*# Pacific Northwest Lab., Richland, Wash.
LANDSAT-4 IMAGE DATA QUALITY ANALYSIS FOR ENERGY RELATED APPLICATIONS Quarterly Report
Goerge E. Wukelic, Principal Investigators 11 Apr. 1983 11 p Sponsored in part by DOE Original contains color imagery. Original photography may be purchased from EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(NASA Order S-12402-C)
(E83-10295; NASA-CR-170326; NAS 1.26:170326; PNL-4723; QR-1) Avail: NTIS HC A02/MF A01 CSCL 05B

No useable LANDSAT 4 TM data were obtained for the Hanford site in the Columbia Plateau region, but TM simulator data for a Virginia Electric Company nuclear power plant was used to test image processing algorithms. Principal component analyses of this data set clearly indicated that thermal plumes in surface waters used for reactor cooling would be discrenible. Image processing and analysis programs were successfully testing using the 7 band Arkansas test scene and preliminary analysis of TM data for the Savanah River Plant shows that current interactive, image enhancement, analysis and integration techniques can be effectively used for LANDSAT 4 data. Thermal band data appear adequate for gross estimates of thermal changes occurring near operating nuclear facilities especially in surface water bodies being used for reactor cooling purposes. Additional image processing software was written and tested which provides for more rapid and effective analysis of the 7 band TM data. A.R.H.

N83-24999*# Technicolor Graphics, Inc., Sioux Falls, S. Dak.
AN INVESTIGATION OF MAGSAT AND COMPLEMENTARY DATA EMPHASIZING PRECAMBRIAN SHIELDS AND ADJACENT AREAS OF WEST AFRICA AND SOUTH AMERICA Quarterly Report, 1 Jan. - 31 Mar. 1983
David A. Hastings, Principal Investigator 31 Mar. 1983 7 p Sponsored by NASA ERTS
(Contract DI-14-08-0001-20129)
(E83-10296; NASA-CR-170327; NAS 1.26:170327) Avail: NTIS HC A02/MF A01 CSCL 05B

There is lack of acceptance of quantitative crustal models by specialists on regional geology because of the problem of east-west banding on MAGSAT anomaly maps. The possibility of some of the Earth's magnetic field being created in the mantle below the Curie isotherm is discussed as well as the need to remove spherical harmonics of degrees less than 15 from the anomaly map. Two dimensional models were produced for northern South America that might be considered as working models. These models suggest that the presumed Amazon River depression is better developed near Belem and in the upper Amazon basin than in the central Amazon basin. An attempt is proposed for separating the core field from the crustal field using a flat-Earth model. A.R.H.

N83-25000*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE INFLUENCE OF SNOW DEPTH AND SURFACE AIR TEMPERATURE ON SATELLITE-DERIVED MICROWAVE BRIGHTNESS TEMPERATURE
J. L. Foster, D. K. Hall, A. T. C. Chang, A. Rango, L. J. Allison, and B. C. Diesen, III May 1980 27 p refs ERTS
(E83-10297; NASA-TM-80695; G-F4507; NAS 1.15:80695) Avail: NTIS HC A03/MF A01 CSCL 08L

Areas of the steppes of central Russia, the high plains of Montana and North Dakota, and the high plains of Canada were studied in an effort to determine the relationship between passive microwave satellite brightness temperature, surface air temperature, and snow depth. Significant regression relationships were developed in each of these homogeneous areas. Results show that sq R values obtained for air temperature versus snow depth and the ratio of microwave brightness temperature and air temperature versus snow depth were not as the sq R values obtained by simply plotting microwave brightness temperature versus snow depth. Multiple regression analysis provided only marginal improvement over the results obtained by using simple linear regression. Author

N83-25001*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ATMOSPHERIC CORRECTION ANALYSIS ON LANDSAT DATA OVER THE AMAZON REGION
Nelson de Jesus Parada, Principal Investigator, Luiz Alberto Vieira Dias, Joao Roberto dosSantos, and Antonio Roberto Formaggio Apr. 1983 7 p refs Presented at the Symp. on Machine Processing of Remotely Sensed Data, Lafayette, Ind., 21-23 Jun. 1983 Submitted for publication Sponsored by NASA Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS
(E83-10298; NASA-CR-170328; NAS 1.26:170328; INPE-2696-PRE/293) Avail: NTIS HC A02/MF A01 CSCL 04A

The Amazon Region natural resources were studied in two ways and compared. A LANDSAT scene and its attributes were selected, and a maximum likelihood classification was made. The scene was atmospherically corrected, taking into account Amazonic

peculiarities revealed by (ground truth) of the same area, and the subsequent classification. Comparison shows that the classification improves with the atmospherically corrected images. Author

N83-25002*# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
METHODOLOGY OF REMOTE SENSING DATA INTERPRETATION AND GEOLOGICAL APPLICATIONS [METODOLOGIA DE INTERPRETACAO DE DADOS DE SENSORIAMENTO REMOTO E APLICACOES EM GEOLOGIA]
Nelson de Jesus Parada, Principal Investigator, Paulo Veneziani, and Celio Eustaquio dosAnjos Nov. 1982 62 p refs In PORTUGUESE; ENGLISH summary Sponsored by NASA ERTS (E83-10299; NASA-CR-170329; NAS 1.26:170329; INPE-2227-MD/014) Avail: NTIS HC A04/MF A01 CSCL 05B

Elements of photointerpretation discussed include the analysis of photographic texture and structure as well as film tonality. The method used is based on conventional techniques developed for interpreting aerial black and white photographs. By defining the properties which characterize the form and individuality of dual images, homologous zones can be identified. Guy's logic method (1966) was adapted and used on functions of resolution, scale, and spectral characteristics of remotely sensed products. Applications of LANDSAT imagery are discussed for regional geological mapping, mineral exploration, hydrogeology, and geotechnical engineering in Brazil. A.R.H.

N83-25003*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
COMPARISON OF MULTISPECTRAL REMOTE-SENSING TECHNIQUES FOR MONITORING SUBSURFACE DRAIN CONDITIONS
Robert C. Goettelman (EAL Corp., Richmond, Calif.), Luther B. Grass (Agricultural Research Service, Brawley, Calif.), John P. Millard, and Paul R. Nixon (Agricultural Research Service, Weslaco, Tex.) May 1983 19 p refs
(NASA-TM-84317; A-9188; NAS 1.15:84317) Avail: NTIS HC A02/MF A01 CSCL 08H

The following multispectral remote-sensing techniques were compared to determine the most suitable method for routinely monitoring agricultural subsurface drain conditions: airborne scanning, covering the visible through thermal-infrared (IR) portions of the spectrum; color-IR photography; and natural-color photography. Color-IR photography was determined to be the best approach, from the standpoint of both cost and information content. Aerial monitoring of drain conditions for early warning of tile malfunction appears practical. With careful selection of season and rain-induced soil-moisture conditions, extensive regional surveys are possible. Certain locations, such as the Imperial Valley, Calif., are precluded from regional monitoring because of year-round crop rotations and soil stratification conditions. Here, farms with similar crops could time local coverage for bare-field and saturated-soil conditions. Author

N83-25004# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
APPLICATION OF REMOTE SENSING TO URBAN STUDIES [APLICACOES DE SENSORIAMENTO REMOTO A ESTUDOS URBANOS]
Maria de Lourdes Neves deOliveira Jan. 1983 22 p refs In PORTUGUESE; ENGLISH summary
(INPE-2625-NTE/197) Avail: NTIS HC A02/MF A01

Applications of remote sensing to urban studies are described. They are related to: (1) land use mapping, (2) population estimation; (3) determination transportation studies, (4) engineering projects, and (5) municipal inspection. S.L.

N83-25005# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RADIATION BALANCE OF SOYBEANS GROWN IN BRAZIL
R. G. B. Andre and Y. Viswanadham Apr. 1983 39 p refs Submitted for publication
(INPE-2709-PRE/297) Avail: NTIS HC A03/MF A01

The radiation balance over a growing soybean crop at a tropical agricultural experimental station, Sao Paulo, Brazil was described. Incoming shortwave radiation S, net radiation R and shortwave reflection coefficient alpha were measured from Nov. 1976 to April 1977 and net longwave radiation L was deduced from the radiation balance equation. Hourly variation of the radiation components S, alpha S, R, and L are presented for four near clear sky day during the different growing crop periods. The diurnal variation of alpha is also presented for these four days. The mean albedo values for this vegetative surface were between 0.12 and 0.26, and inversely related to the vegetation height. The regression analysis of the radiation balance equation was made, and the heating coefficient beta and the long wave exchange coefficient beta and the long wave exchange coefficient gamma were obtained. Author

N83-25006*# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
THE INDIRECT EFFECTS ON THE COMPUTATION OF GEOID UNDULATIONS
Chugiat Wichiencharoen Dec. 1982 103 p refs
(Grant NGR-36-008-161)
(NASA-CR-170347; NAS 1.26:170347; Rept-336) Avail: NTIS HC A06/MF A01 CSCL 08B

The indirect effects on the geoid computation due to the second method of Helmert's condensation were studied. when Helmert's anomalies are used in Stokes's equation, there are three types of corrections to the free air geoid. The first correction, the indirect effect on geoid undulation due to the potential change in Helmert's reduction, had a maximum value of 0.51 meters in the test area covering the United States. The second correction, the attraction change effect on geoid undulation, had a maximum value of 9.50 meters when the 10 deg cap was used in Stokes' equation. The last correction, the secondary indirect effect on geoid undulatin, was found negligible in the test area. The corrections were applied to uncorrected free air geoid undulations at 65 Doppler stations in the test area and compared with the Doppler undulations. Based on the assumption that the Doppler coordinate system has a z shift of 4 meters with respect to the geocenter, these comparisons showed that the corrections presented in this study yielded improved values of gravimetric undulations. Author

N83-25007# Army Engineer Topographic Labs., Fort Belvoir, Va.
FEATURE COMPONENT REDUCTION THROUGH DIVERGENCE ANALYSIS
Michael A. Crombie, Nancy J. Friend, and Robert S. Rand Oct. 1982 29 p
(DA Proj. 4A7-62707-A-855)
(AD-A123474; ETL-0305) Avail: NTIS HC A03/MF A01 CSCL 14/5

An approach to developing a reduced set of texture-like descriptors is presented. Results of several experiments using multi-component vectors are presented including experiments with relaxation techniques to cleanse the test images. In view of these results, the partiality of using more complex feature vectors is questioned. GRA

N83-25008# Army Engineer Topographic Labs., Fort Belvoir, Va.
SCENE CLASSIFICATION RESULTS USING THE MAX-MIN TEXTURE MEASURE
Michael A. Crombie, Robert S. Rand, and Nancy J. Friend Jul. 1982 22 p refs Original contains color illustrations
(DA Proj. 4A7-62707-A-855)
(AD-A123496; ETL-0300) Avail: NTIS HC A02/MF A01 CSCL 14/5

Results from a previous analysis by ETL indicated that the Max-Min texture measure was practical and showed promise of being an efficient tool for image segmentation. Probabilistic relaxation was applied to the results in order to remove ambiguities and to remove noise. Results from the relaxation process were also encouraging and it was decided that both processes, i.e., the classification using Max-Min texture followed by a relaxation of the output, would be applied to full scenes to determine if the techniques were still applicable. Note that tests in the referenced

experiment were limited to regions selected to train the process.
Author (GRA)

N83-25009# Army Engineer Topographic Labs., Fort Belvoir, Va.
VEGETATION AND TERRAIN EFFECTS ON DIGITAL CLASSIFICATION OF LANDSAT IMAGERY
Melvin B. Satterwhite Dec. 1982 61 p refs
(DA Proj. 4A1-61102-B-52-C)
(AD-A124236; ETL-0292) Avail: NTIS HC A04/MF A01

LANDSAT scenes from the northern Chihuahuan Desert, south-central New Mexico and western Texas, taken in March and August 1975, were analyzed using conventional supervised digital image analysis techniques. The study objective was to evaluate the digitally classified LANDSAT image against known ground condition and determine those vegetative and terrain factors that could aid the manual interpretation of the classified image. The interpretation of the image and correct classification of most areas were greatly assisted by knowledge of plant community-landform relations, the species phenological and physiognomic characteristics, and the reflectance-cover relations for the soil and vegetation conditions in each scene. Author (GRA)

N83-25010# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
TEMPORAL IMAGE NORMALIZATION Final Report
Donald J. Gerson, Lynn K. Fehrenbach, and Dennis McTernan 4 Jan. 1983 15 p refs Presented at the ACSM-ASP Conv., Washington, 13-18 Mar. 1983
(AD-A123313) Avail: NTIS HC A02/MF A01 CSCL 09/2

Temporal Image Normalization (TIN) is defined as a process which removes most effects of sun angle, look angle, and atmosphere from temporally separated images of the same area. This process is usually used to prepare images for further analysis. Three approaches are used in the TIN are: (1) analysis of image and scene content (techniques come from the fields of photographic science and photometry), (2) analysis of atmospheric and ephermeris data (techniques come from meteorological theory and usually require extensive measurements of the atmosphere), and (3) combinations of approaches 1 and 2. Five TIN algorithms are discussed and three of them are evaluated in this paper according to the quality of their output images and the degree of normalization achieved. Author (GRA)

N83-25011# Colorado Univ., Boulder. Inst. of Arctic and Alpine Research.
LANDSAT-ASSISTED ENVIRONMENTAL MAPPING IN THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA
Donald A. Walker, William Acevedo (Technicolor Government Services, Moffett Field, Calif.), K. R. Everett (Ohio State Univ.), Leonard Gaydos (Geological Survey, Moffett Field, Calif.), Jerry Brown (Army Cold Regions Research and Engineering Lab.), and Patrick J. Webber Army Cold Regions Research and Engineering Lab. Nov. 1982 70 p refs Original contains color illustrations
(Contract GS-RN-1-7060-0450)
(AD-A123440; CRREL-82-37) Avail: NTIS HC A04/MF A01 CSCL 08/6

This report presents a LANDSAT-derived land cover map of the northwest portion of the Arctic National Wildlife Refuge, Alaska. The report is divided into two parts. The first is devoted to the land cover map with detailed descriptions of the mapping methods and legend. The second part is a description of the study area. The classification system used for the maps is an improvement over existing methods of describing tundra vegetation. It is a comprehensive method of nomenclature that consistently applies the same criteria for all vegetation units. It is applicable for large- and small-scale mapping and is suitable for describing vegetation complexes, which are common in the patterned-ground terrain of the Alaskan Arctic. The system is applicable to LANDSAT-derived land cover classifications. The description of the study area focuses on five primary terrain types: flat thaw-lake plains, hilly coastal plains, foothills, mountainous terrain, and river flood plains. Topography, landforms, soils and vegetation are described for each terrain type. The report also contains area summaries for the LANDSAT-derived map categories. The area summaries are generated for the five terrain types and for the 89 townships within the study areas. Two land cover maps at 1:250,000 are included.
GRA

N83-25012# Alabama Univ., University. School of Mines and Energy Development.
LAND USE/MINERAL RIGHTS MAP SERIES
Neal G. Lineback and David C. Weaver Sep. 1982 15 p refs
(DE83-901050; NP-3901050) Avail: NTIS HC A02/MF A01

The ongoing Land Use/Mineral Rights Map Series was designed to map the existing land uses and mineral rights in and around the Warrior Coal Basin. The map series provides baseline data for monitoring all land use changes in the Warrior Basin and for establishing a record of mineral rights useful in classifying some record discrepancies and assisting the mining industry and its regulatory agencies in organizing mineral rights data. Ten additional maps were completed during this 1981-82 funding period. DOE

N83-25013# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
AGRICULTURAL PRODUCTION IN THE US BY COUNTY: A COMPILATION OF INFORMATION FROM THE 1974 CENSUS OF AGRICULTURE FOR USE IN TERRESTRIAL FOOD-CHAIN TRANSPORT AND ASSESSMENT MODELS
R. W. Shor, C. F. Baes, III, and R. D. Sharp Jan. 1982 347 p refs
(Contracts W-7405-eng-26; EPA-78-D-X0394)
(DE82-006143; ORNL-5768) Avail: NTIS HC A15/MF A01

Terrestrial food chain models that simulate the transport of environmentally released radionuclides incorporate parameters describing agricultural production and practice. Often a single set of default parameters, such as that listed in USNRC Regulatory Guide 1.109, is used in lieu of site specific information. However, the geographical divesity of agricultural practice in the United States suggests the limitations of a single set of default parameters for assessment models. Default parameters with a county wide resolution based on analysis of the 1974 US Census of Agriculture for use in terrestrial food chain models is documented. This report describes these data bases, their limitations, and lists default parameters by county. Vegetable productin is described for four categories: leafy vegetables; vegetables and fruits exposed to airborne material; vegetables, fruits, and nuts protected from airborne materials; and grains. DOE

N83-25014# High Life Helicopters, Inc., Puyallup, Wash.
AERIAL RADIOMETRIC AND MAGNETIC SURVEY. MARYSVALE DETAIL SURVEY, RICHFIELD NATIONAL TOPOGRAPHIC MAP SHEET, UTAH. VOLUME 1: GENERAL NARRATIVE REPORT Final Report
1982 287 p refs Prepared in cooperation with Geodata International, Inc. 4 Vol.
(Contract DE-AC13-77GJ-01678)
(DE82-011041; GJBX-99-82-Vol-1) Avail: NTIS HC A13/MF A01

Airborne gamma radiation and total magnetic survey for the area identified as Marysvale, located in southwestern Utah, is presented. The airborne data gathered is reduced by ground computer facilities to yield profile plots of the quivalent uranium, thorium and potassium gamma radiation intensities, the ratios of these intensities, the total gamma radiation counting rate and the Earth's residual magnetic field intensity. Profile plots of the aircraft's altitude above the Earth's surface, the ambient temperature and pressure, and the magnetic field data measured by a base station magnetometer are presented. The distribution of the radiometric data in terms of its established geochemical map units, derived by geochemical analysis methods, is included. The determination of the geochemical units presented is established from the radiometric and magnetic contour maps and the multi-variate analysis map. The various geologic and geochemical units are described. The following topics are included: flight operations; data acquisition and processing; synopsis of surface geology; geochemi-

cal data interpretation; geologic-geochemical analogy; summary and recommendations for geochemical units. Author

N83-25015# High Life Helicopters, Inc., Puyallup, Wash.
AERIAL RADIOMETRIC AND MAGNET SURVEY. MARYSVALE DETAIL SURVEY, RICHFIELD NATIONAL TOPOGRAPHIC MAP SHEET, UTAH. VOLUME 2: RADIOMETRIC MULTIVARIABLE STACKED PROFILE DATA Final Report
1982 815 p refs Prepared in cooperation with Geodata International, Inc. 4 Vol.
(Contract DE-AC13-77GJ-01678)
(DE82-009640; GJBX-99-82-Vol-2) Avail: NTIS HC A99/MF A01

A systematic airborne gamma radiation and total magnetic survey is presented. The airborne data are reduced by ground computer facilities. Profile plots of the aircraft's altitude above the earth's surface, the ambient temperature and pressure, and the magnetic field data measured by a base station magnetometers are presented. The distribution of the radiometric data for established geochemical map units, are evaluated. The geochemical units are established from the analysis of the radiometric and magnetic contour maps and the multivariate analysis map. A general description of the area, including descriptions of the various geologic and geochemical units, is included. The 10 variable radiometric stacked profile data for the entire survey area is presented. DOE

N83-25016# High Life Helicopters, Inc., Puyallup, Wash.
AERIAL RADIOMETRIC AND MAGNETIC SURVEY. MARYSVALE DETAIL SURVEY, RICHFIELD NATIONAL TOPOGRAPHIC MAP SHEET, UTAH. VOLUME 3: MAGNETIC AND ANCILLARY STACKED PROFILE DATA Final Report
1982 815 p refs Prepared in cooperation with Geodata International, Inc. 4 Vol.
(Contract DE-AC13-77GJ-01678)
(DE82-009646; GJBX-99-82-Vol-3) Avail: NTIS HC A99/MF A01

The airborne data gathered is reduced by ground computer facilities to yield profile plots of the equivalent uranium, thorium and potassium gamma radiation intensities, the ratios of these intensities, the total gamma radiation counting rate and the Earth's residual magnetic field intensity. Profile plots of the aircraft's altitude above the Earth's surface, the ambient temperature and pressure, and the magnetic field data measured by a base station magnetometer is presented. The distribution of the radiometric data for its established geochemical map units are evaluated. The geochemical units are established from the analysis of the radiometric and magnetic contour maps and the multivariate analysis map. A general description of the area and descriptions of the various geologic and geochemical units, are included. The 5 variable residual magnetic and ancillary stacked profile data for the entire survey area are presented. DOE

N83-25017# High Life Helicopters, Inc., Puyallup, Wash.
AERIAL RADIOMETRIC AND MAGNETIC SURVEY. MARYSVALE DETAIL SURVEY, RICHFIELD NATIONAL TOPOGRAPHIC MAP SHEET, UTAH. VOLUME 4: GRAPHIC DATA MAPS Final Report
1982 248 p refs Prepared in cooperation with Geodata International, Inc. 4 Vol.
(Contract DE-AC13-77GJ-01678)
(DE82-009647; GJBX-99-82-Vol-4) Avail: NTIS HC A11/MF A01

Gamma radiation and total magnetic survey in southwestern Utah, is presented. The airborne data gathered is reduced by ground computer facilities to yield profile plots of the equivalent uranium, thorium and potassium gamma radiation intensities, the ratios of these intensities, the total gamma radiation counting rate and the earth's residual magnetic field intensity. Profile plots of the aircraft's altitude above the earth's surface, the ambient temperature and pressure, and the magnetic field data measured by a base station magnetometer are presented. An evaluation of the distribution of the radiometric data in terms of its established geochemical map units, which were derived via geochemical analysis methods, for the entire survey area has been prepared and is included. The determination of the geochemical units is established principally from the analysis of the radiometric and magnetic contour maps and, more importantly, the multivariate analysis map. A general description of the area, including descriptions of the various geologic and geochemical units, is included. The following maps at a scale of 1:62,500; flight line base maps; radiometric and magnetic contour maps; multivariate analysis maps; geochemical analysis maps; geochemical composite maps are included. DOE

N83-25018# North Dakota Univ., Grand Forks.
DICKINSON GEOTHERMAL STUDY Final Report
G. O. Fossum, K. L. Harris, D. J. Hassett, D. V. Mathsen, and T. C. Owens Jun. 1982 95 p refs Prepared for Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho
(Contract DE-AC07-76ID-01570)
(DE82-016945; EGG-2151) Avail: NTIS HC A05/MF A01

The Inyan Kara Formation provides an abundant source of warm (54 to 71 C) but salty (7400 mg/l combined Na and Cl ions) water for much of southwestern North Dakota. The city of Dickinson, ND, overlies this aquifer at 1676 to 1768 meters. This study investigates the potential of using this hydrothermal resource as an energy source for a district heating system in a new undeveloped addition to Dickinson. In addition, the use of a reverse osmosis system to desalinate the water is considered along with other water treatment processes necessary to allow use of this water in the existing city water supply. The results of the study indicate the economic requirements to make this concept feasible and outline the consideration to carry the project into the design phase. DOE

N83-25019# Michigan Univ., Ann Arbor. Dept. of Geological Sciences.
APPRAISAL OF LANDSAT LINEAMENTS AS FAULTS IN WESTERN KENTUCKY Final Report
Philip L. Jackson Dec. 1982 71 p refs
(Contract DE-AC21-81MC-16463)
(DE83-005412; DOE/MC-16463/1324; Rept-019277-C) Avail: NTIS HC A04/MF A01

Lineaments which resemble those produced by known, mapped geologic faults are found on LANDSAT images of a portion of Western Kentucky. Since fractures and faults are suspected to be necessary for gas production in the eastern gas shales, it would be valuable to evaluate such ineaments as faults. For this purpose surface geophysical measurements were made across the lineaments and also across mapped faults for control. Resistivity, gravity, and radiation measurements showed that the mapped faults produce geophysically measured anomalies, and also gave probable indication of faulting along two LANDSAT lineamants. These economical geophysical measurements are a useful, but not certain, method of evaluating LANDSAT lineaments as faults. DOE

N83-25020# Dravo Lime Co., Pittsburgh, Pa.
DISTRIBUTION AND ANALYSIS OF HIGH-PURITY MAGNESIAN LIMESTONES IN THE UNITED STATES Final Report
R. C. Freas and M. E. Horne Dec. 1982 136 p refs
(EPRI Proj. 982-21)
(DE83-901141; EPRI-CS-2783) Avail: NTIS HC A07/MF A01

A literature and operations data study was made of the distribution of magnesian limestones in the United States. Based upon this work 13 field samples were collected for wet chemical and X-ray analyses. The distribution of magnesian limestones in the United States is discussed as is the occurrence of magnesium in limestone. Magnesian limestone was found to be distributed in a similar pattern to that of carbonate rocks in general, but on a much more restrictive basis. Magnesian limestones were found to comprise a relatively minor percentage of the total number of carbonate rocks present in the United States. X-ray studies of the field samples could not confirm the presence of magnesium in solid solution with calcite in any of the formations tested. DOE

N83-25021# Oak Ridge National Lab., Tenn. Engineering Technology Div.

CHATTANOOGA SHALE: AN ASSESSMENT OF THE RESOURCE AND TECHNOLOGY FOR RECOVERY OF HYDROCARBONS AND MINERALS

I. Spiewak, E. S. Bomar, T. R. Butz, J. G. Delene, J. E. Dobson, G. K. Eddlemon, E. C. Fox, C. W. Gehrs, R. N. Helgerson, R. H. Ketelle et al Apr. 1982 238 p refs

(Contract W-7405-eng-26)

(DE82-012372; ORNL/TM-7920) Avail: NTIS HC A11/MF A01

Chattanooga shale, a large and mineral rich member of the Devonian oil shales of the Eastern United States, is a resource of about 100 billion bbl of oil, 10 million tons of uranium, and significant quantities of other metals including aluminum, molybdenum, cobalt, columbium, and vanadium. Chattanooga shale is not yet ready for commercial exploitation. It is indicated that a large scale combined operation for oil and metals recovery is economically attractive. Some of the principal technical problems that require resolution are: roof stability and water intrusion associated with the underground mining of Chattanooga shale, the need for environmentally acceptable methods for disposal of tremendous quantities of spent shale, and the need for processes that can efficiently recover most of the hydrocarbon and mineral values with minimal loss of expensive processing reagents. DOE

N83-25022# Oak Ridge Gaseous Diffusion Plant, Tenn.

HYDROGEOCHEMICAL AND STREAM-SEDIMENT RECONNAISSANCE BASIC DATA FOR BOISE QUADRANGLE, OREGON; IDAHO

9 Nov. 1982 50 p

(Contract DE-AC13-76GJ-01664)

(DE83-004483; GJBX-171-82; K/UR-451) Avail: NTIS HC A03/MF A01

Hydrogeochemical data are compiled for surface water and ground water from the Boise Quadrangle in Oregon and Idaho. DOE

N83-25023# North Dakota Univ., Grand Forks. Engineering Experiment Station.

EVALUATION OF HYDROTHERMAL RESOURCES OF NORTH DAKOTA, PHASE 3 Final Technical Report

Kenneth L. Harris, Francis L. Howell, Brad L. Wartman, and Sidney B. Anderson Aug. 1982 209 p refs

(Contract DE-FC07-79ID-12030)

(DE83-004641; DOE/ID-12030/T3; Bull-82-08-EES-01) Avail: NTIS HC A10/MF A01

The hydrothermal resources of North Dakota were evaluated. This evaluation was based on existing data on file with the North Dakota Geological Survey (NDGS) and other state and federal agencies, and field and laboratory studies conducted. The principal sources of data used during the study were WELLFILE, the computer library of oil and gas well data developed during the Phase 1 study, and WATERCAT, a computer library system of water well data assembled during the Phase 2 study. A field survey of the shallow geothermal gradients present in selected ground water observation holes was conducted. Laboratory determinations of the thermal conductivity of core samples were done to facilitate heat flow calculations on those holes of convenience cased. DOE

N83-25024*# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.

DEVELOPMENT AND TESTING OF LANDSAT-ASSISTED PROCEDURES FOR COST-EFFECTIVE FOREST MANAGEMENT Final Report, Apr. - Sep. 1982

John E. Colwell, Paul A. Sanders, and Fred J. Thomson 30 Sep. 1983 57 p refs Sponsored by NASA, USDA, Dept. of Commerce, Dept. of the Interior, and Agency for International Development Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198 ERTS

(Contract USDA/FS-53-3187-2-24; Proj. AgRISTARS)

(E83-10289; NASA-CR-170322; RR-E2-04368; NAS 1.26:170322; ERIM-161800-1-F; NFAP-82-308) Avail: NTIS HC A04/MF A01 CSCL 02F

The utility of single-date categorized LANDSAT data as a source of land cover information was investigated for use in assessing elk habitat quality in the Clearwater National Forest in Idaho. The LANDSAT data categorized conifer forests on the basis of the percentage crown closure. This information was used to evaluate habitat quality on the basis of the ratio of cover to forage. The preliminary conclusion is that such LANDSAT data can be helpful if the relationships between crown closure and hiding cover can be adequately defined. In addition, LANDSAT data from 1972 and 1981 were merged and change images were created which indicated areas where major changes were taking place in the forest. These areas could then be examined by field survey or aerial photography to further characterize the nature and magnitude of the change in the areas defined. Data bases can thus be updated more efficiently and economically. A.R.H.

N83-24939# California Univ., Berkeley. Lawrence Berkeley Lab.

THEORETICAL MODEL OF FLUID FLOW THROUGH A DEFORMABLE ROCK FRACTURE

Y. W. Tsang and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 22-23 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24944# California Univ., Berkeley. Lawrence Berkeley Lab.

VERIFICATION AND IMPROVEMENT OF A PREDICTIVE MODEL FOR RADIONUCLIDE MIGRATION

C. W. Miller, L. V. Benson, and C. L. Carnahan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 38-41 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24945# California Univ., Berkeley. Lawrence Berkeley Lab.

URANIUM DISEQUILIBRIUM MEASUREMENTS ON GROUNDWATERS

M. C. Michel and W. R. Keyes *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 42-44 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24966# California Univ., Berkeley. Lawrence Berkeley Lab.

EVALUATION OF THE HYDROTHERMAL POTENTIAL OF THE ASHDOD AREA, ISRAEL

S. M. Benson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 105-107 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24969# California Univ., Berkeley. Lawrence Berkeley Lab.

MODELING OF FRACTURE RESERVOIRS

K. Pruess, T. N. Narasimhan, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 113-115 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24987# California Univ., Berkeley. Lawrence Berkeley Lab.

ENHANCED RECOVERY OF HEAVY OILS WITH ALKALI

C. J. Radke and W. H. Somerton *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 166-167 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

N83-24990# California Univ., Berkeley. Lawrence Berkeley Lab.

MINE VENTILATION PLANNING: A CASE STUDY

M. J. McPherson and M. Hood *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 173-177 refs (For primary document see N83-24933 14-42)

Avail: NTIS HC A09/MF A01

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-25025* National Aeronautics and Space Administration, Washington, D. C.
ENERGY. A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 36, JANUARY 1983
Jan. 1983 326 p
(NASA-SP-7043(36); NAS 1.21:7043(36)) Avail: NTIS HC $15.00 CSCL 10B

This bibliography lists 1297 reports, articles, and other documents introduced into the NASA scientific and technical information system from October 1, 1982 through December 31, 1982. Author

N83-25026*# California Univ., Berkeley. Electronics Research Lab.
COHERENT CONVERSION OF THE SUNLIGHT SPECTRUM Final Report, 28 Jul. 1980 - 30 Apr. 1982
T. K. Gustafson [1982] 147 p refs
(Grant NAG3-88)
(NASA-CR-170185; NAS 1.26:170185) Avail: NTIS HC A07/MF A01 CSCL 10A

Efforts related to the utilization of tunneling junctions for the conversion of radiative power to electrical power are reported. The theoretical foundations for these particular devices is presented along with a discussion of many of the practical problems associated with the implementation of such devices. Author

N83-25027*# Crystal Systems, Inc., Salem, Mass.
SILICON INGOT CASTING: HEAT EXCHANGE METHOD (HEM). MULTI-WIRE SLICING: FIXED ABRASIVE SLICING TECHNIQUE (FAST). PHASE 3 AND PHASE 4: SILICON SHEET GROWTH DEVELOPMENT FOR THE LARGE AREA SHEET TASK OF THE LOW-COST SOLAR ARRAY PROJECT Final Report, 15 Dec. 1978 - 30 Jun. 1981
Frederick Schmid and Chandra P. Khattak Dec. 1982 254 p refs Sponsored in part by DOE Prepared for JPL
(Contract JPL-954373)
(NASA-CR-170213; JPL-9950-797; DOE/JPL-954373-81/19; NAS 1.26:170213; DRL-58-DRD-SE-7) Avail: NTIS HC A12/MF A01 CSCL 10A

Several areas of silicon sheet growth development are addressed including: silicon ingot casting, heat exchanger method, multiwire slicing, and fixed abrasive slicing technique. For individual titles, see N83-25028 through N83-25033.

N83-25028*# Crystal Systems, Inc., Salem, Mass.
PART 1: SILICON INGOT CASTING. HEAT EXCHANGER METHOD (HEM)
In its Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 111 p refs (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

Directional solidification by the Heat Exchanger Method (HEM) is a viable approach for directional solidification of silicon ingots used for terrestrial solar cell applications. Some of the significant advances made during this phase of the program were: ingot size, 34 cm x 34 cm x 17 cm - 45 kg, usable material yield - < 90%, solar cell efficiency averaged over the whole ingot - 85% of control CZ (35 kg ingot), very uniform resistivity over the boule, and cycle time for 36 kg ingots - 56 hours. Some of the problems encountered were growth rate decrease with increased ingot height, silicon carbide precipitates, and high dislocation density in HEM material. The silicon carbide is attributed to backstreaming of oil vapors from the vacuum pump; the high dislocation density is associated with the thermal history of the boule. Author

N83-25029*# Crystal Systems, Inc., Salem, Mass.
PART 2: MULTI-WIRE SLICING. FIXED ABRASIVE SLICING TECHNIQUE (FAST)
In its Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 67 p refs (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

The Fixed Abrasive Slicing Techniques (FAST) is a new slicing technique that was developed to slice ingots more effectively. It was demonstrated that 25 wafers/cm can be sliced from 10cm diameter and 19 wafers/cm from 15 cm diameter ingots. Over 99% yield (222 out of a possible 224) was demonstrated during slicing of a 10 cm diameter ingots at 25 wafers/cm. The average thickness of wafers was 0.249 mm and the kerf was 0.151 mm. Slicing rates as high as 0.14 mm/min were also demonstrated for 10 cm diameter ingots. Author

N83-25030*# Crystal Systems, Inc., Salem, Mass.
SILICON SLICING BY FIXED ABRASIVE SLICING TECHNIQUE
F. Schmid and C. P. Khattak *In its* Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 3 p (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

One of the major cost factors in silicon ingot technology adaptation for terrestrial photovoltaic application is in slicing boules into wafers. The most developed industrial practice is the Internal Diameter (ID) slicing. This method utilizes diamond cutting. The diamond stands up for long periods, hence, the cost of expendable materials is low. However, the ID technology as practiced today has poor material utilization. The Multiblade Slurry (MBS) method has low equipment and labor costs but its expendable material costs are high. Recently Multiwire Slurry (MWS) technology has shown very good material utilization, but its expendable material costs are even higher than MBS. The multiwire Fixed Abrasive Slicing Technique (FAST) still in advanced development stage, combines the low expendable material costs of ID method, the low labor and equipment costs of MBS and high material utilization of MWS. Author

N83-25031*# Crystal Systems, Inc., Salem, Mass.
SILICON CRYSTAL GROWTH IN VACUUM
C. P. Khattak and F. Schmid *In its* Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 4 p (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

The most developed process for silicon crystal growth is the Czochralski (CZ) method which was in production for over two decades. In an effort to reduce cost of single crystal silicon for photovoltaic applications, a directional solidification technique, Heat Exchanger Method (HEM), was adapted. Materials used in HEM and CZ furnaces are quite similar (heaters, crucibles, insulation, etc.). To eliminate the cost of high purity argon, it was intended to use vacuum operation in HEM. Two of the major problems encountered in vacuum processing of silicon are crucible decomposition and silicon carbide formation in the melt. Author

N83-25032*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ORIGIN OF SiC IMPURITIES IN SILICON CRYSTALS GROWN FROM THE MELT IN VACUUMS
F. Schmid, C. P. Khattak, T. G. Digges, Jr., and Larry Kaufman (Manlabs, Inc., Cambridge, Mass.) *In* Crystal Systems, Inc. Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 5 p refs Repr. from J. of the Electrochem. Soc., v. 126, no. 6, Jun. 1979 p 935-938 Prepared in cooperation with Crystal Systems, Inc., Salem, Mass. (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

A main source of high carbon levels in silicon crystals grown from melt under reduced pressures and contained in silica crucibles supported by graphite retainer/susceptor was identified by thermodynamic analysis. The calculations were verified by experi-

mental results and the carbon level is reduced by approximately 50% with the use of molybdenum retainers. Author

N83-25033*# Crystal Systems, Inc., Salem, Mass.
SINGLE CRYSTAL GROWTH OF UPGRADED METALLURGICAL SILICON BY HEM FOR PHOTOVOLTAIC APPLICATIONS
C. P. Khattak, F. Schmid, and L. P. Hunt (Dow Corning Corp., Hemlock, Mich.) *In its* Silicon Ingot Casting, Phase 3 and Phase 4 Dec. 1982 12 p refs (For primary document see N83-25027 14-44)
Avail: NTIS HC A12/MF A01 CSCL 10A

Commercially available metallurgical grade (MG) silicon has high B and P content which is not reduced significantly by directional solidification. By choosing high purity raw materials for an experimental Submerged Electrode Arc Furnace, most of the impurities are reduced to 10 ppmw. Directional solidification of upgraded metallurgical grade (UMG) silicon by the Heat Exchanger Method (HEM) has produced 16 cm x 16 cm cross section ingots with nearly single crystal structure. The main problem encountered during directional solidification was SiC impurities dispersed through the structure. Solar cells fabricated from UMG silicon that was directionally solidified twice by HEM have shown up to 12.33% (am1) conversion efficiency. Author

N83-25034*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROCEEDINGS OF THE FLAT-PLATE SOLAR ARRAY WORKSHOP ON THE SCIENCE OF SILICON MATERIAL PREPARATION
1 Feb. 1983 316 p refs Workshop presented at Phoenix, Ariz., 23-25 Aug. 1982 Sponsored in part by NASA
(Contract DE-AI01-76ET-20356)
(NASA-CR-170318; DOE/JPL-1012/81; JPL-Pub-83-13; NAS 1.26:170318) Avail: NTIS HC A14/MF A01 CSCL 10A

Several areas of silicon material preparation were addressed including silicon production and purity, thermodynamics, kinetics, mechanisms, particle formation and growth, deposition in fluidized bed reactors, and chemical vapor deposition. Twenty-two papers were presented. B.G.

N83-25035*# Stanford Univ., Calif. Center for Materials Research.
MATERIALS FOR HIGH-TEMPERATURE THERMOELECTRIC CONVERSION Annual Technical Report
R. S. Feigelson and D. Elwell Apr. 1983 25 p refs
(Grant NAGw-268)
(NASA-CR-170316; NAS 1.26:170316; CMR-83-2) Avail: NTIS HC A02/MF A01 CSCL 10A

High boron materials of high efficiency for thermoelectric power generation and capable of prolonged operation at temperatures over 1200 C are discussed. Background theoretical studies indicated that the low carrier mobility of materials with beta boron and related structures is probably associated with the high density of traps. Experimental work was mainly concerned with silicon borides in view of promising data from European laboratories. A systematic study using structure determination and lattice constant measurements failed to confirm the existence of an SiBn phase. Only SiB6 and a solid solution of silicon in beta boron with a maximum solid solubility of 5.5-6 at % at 1650 C were found. Author

N83-25036*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
TESTING AND PERFORMANCE CHARACTERISTICS OF A 1-kW FREE PISTON STIRLING ENGINE
Jeff Schreiber Apr. 1983 48 p refs
(NASA-TM-82999; E-1435; NAS 1.15:82999) Avail: NTIS HC A03/MF A01 CSCL 10B

A 1 kW single cylinder free piston Stirling engine, configured as a research engine, was tested with helium working gas. The engine features a posted displacer and dashpot load. The test results show the engine power output and efficiency to be lower than those observed during acceptance tests by the manufacturer. Engine tests results are presented for operation at the two heater head temperatures and with two regenerator porosities, along with flow test results for the heat exchangers. Author

N83-25037*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IGCC PERFORMANCE COMPARISON FOR VARIATIONS IN GASIFIER TYPE AND GAS TURBINE FIRING TEMPERATURE
Robert J. Stochl and Joseph J. Nainiger Jan. 1983 40 p refs
(NASA-TM-83310; E-1549; NAS 1.15:83310) Avail: NTIS HC A03/MF A01 CSCL 10B

Performance estimates were made for a series of integrated coal gasification combined cycle (IGCC) power systems using three generic types of coal gasification subsystems. The objectives of this study were (1) to provide a self consistent comparison of IGCC systems using different types of gasifiers and different oxidants and (2) to use this framework of cases to evaluate the effect of a gas turbine firing temperature and cooling approach an overall system efficiency. The basic IGCC systems considered included both air and oxygen blown versions of a fluidized bed gasifier, represented by the Westinghouse design, and an entrained bed gasifier, represented by the Texaco design. Also considered were systems using an oxygen blown, fixed bed gasifier, represented by the British Gas Corporation (BGC) slagging gasifier. All of these gasifiers were integrated with a combined cycle using a gas turbine firing temperature of 1700 K (2600 F) and a compressor pressure ratio of 16:1. Steam turbine throttle conditions were chosen to be 16.6 MPa/811 K (2400 psia/1000 F) with a single reheat to 810 K (1000 F). Some of these cases were modified to allow the evaluation of the effect of gas turbine firing temperature. Turbine firing temperatures from state of the art 1365 K (2000 F) to an advanced technology 1920 K (3000 F) were analyzed. A turbine cooling technology that maintains metal temperatures below acceptable limits was assumed for each level of firing temperature. System performance comparisons were made using three advanced turbine cooling technologies for the 1920 K (3000 F) firing temperature. The results indicate that the IGCC using the BGC gasifier had the highest net system efficiency (42.1 percent) of the five gasification cases considered. B.W.

N83-25038*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
CYCLE LIFE TEST AND FAILURE MODEL OF NICKEL-HYDROGEN CELLS
John J. Smithrick 1983 16 p refs Proposed for presentation at the 18th Intersoc. Energy Conversion Eng. Conf., 21-26 Aug. 1983; sponsored by American Inst. of Chemical Engineers, IEEE, AIAA, American Chemical Society, ANS, ASME, and SAE
(NASA-TM-83375; E-1643; NAS 1.15:83375) Avail: NTIS HC A02/MF A01 CSCL 10C

Six ampere hour individual pressure vessel nickel hydrogen cells were charge/discharge cycled to failure. Failure as used here is defined to occur when the end of discharge voltage degraded to 0.9 volts. They were cycled under a low earth orbit cycle regime to a deep depth of discharge (80 percent of rated ampere hour capacity). Both cell designs were fabricated by the same manufacturer and represent current state of the art. A failure model was advanced which suggests both cell designs have inadequate volume tolerance characteristics. The limited existing data base at a deep depth of discharge (DOD) was expanded. Two cells of each design were cycled. One COMSAT cell failed at cycle 1712 and the other failed at cycle 1875. For the Air Force/Hughes cells, one cell failed at cycle 2250 and the other failed at cycle 2638. All cells, of both designs, failed due to low end of discharge voltage (0.9 volts). No cell failed due to electrical shorts. After cell failure, three different reconditioning tests (deep discharge, physical reorientation, and open circuit voltage stand) were conducted on all cells of each design. A fourth reconditioning test (electrolyte addition) was conducted on one cell of each design. In addition post cycle cell teardown and failure analysis were performed on the one cell of each design which did not have electrolyte added after failure. Author

N83-25039*# New Mexico Univ., Albuquerque. Dept. of Electrical and Computer Engineering.

STUDY OF THE PHOTOVOLTAIC EFFECT IN THIN FILM BARIUM TITANATE Final Report

W. W. Granneman and Vineet S. Dharmadhikari Feb. 1983 57 p (Grant NAG1-95)

(NASA-CR-170333; NAS 1.26:170333; EECE-275(83)-NASA-931-1) Avail: NTIS HC A04/MF A01 CSCL 10A

The feasibility of making non-volatile digital memory devices of barium titanate, BaTiO3, that are integrated onto a silicon substrate with the required ferroelectric film produced by processing, compatible with silicon technology was examined. Author

N83-25040# Honeywell Systems and Research Center, Minneapolis, Minn.

SPECTROPHOTOVOLTAIC ORBITAL POWER GENERATION Final Report, Aug. 1981 - Nov. 1982

Gary Knowles and Joe Carroll 31 Mar. 1983 82 p refs (Contract NAS8-22511)

(NASA-CR-170754; NAS 1.26:170754; HONEYWELL-83SRC22) Avail: NTIS HC A05/MF A01 CSCL 10B

A subscale model of a photovoltaic power system employing spectral splitting and 1000:1 concentration was fabricated and tested. The 10-in. aperture model demonstrated 15.5% efficiency with 86% of the energy produced by a GaAs solar cell and 14% of the energy produced by an Si cell. The calculated efficiency of the system using the same solar cells, but having perfect optics, would be approximately 20%. The model design, component measurements, test results, and mathematical model are presented. Author

N83-25041*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

DOE AND AID STAND-ALONE PHOTOVOLTAIC ACTIVITIES

William J. Bifano and Anthony F. Ratajczak 1983 9 p refs Presented at the Ann. Meeting of the Am. Solar Energy Soc., Minneapolis, 1-3 Jun. 1983

(Contract DE-AI01-79ET-20485)

(NASA-TM-83374; E-1642; NAS 1.15:83374; DOE/NASA/20485-15) Avail: NTIS HC A02/MF A01 CSCL 10A

The NASA Lewis Research Center (LeRC) is managing stand-alone photovoltaic (PV) system activities sponsored by the U.S. Department of Energy (DOE) and the U.S. Agency for International Development (AID). The DOE project includes village PV power demonstration projects in Gabon (four sites) and the Marshall Islands, PV-powered medical refrigerators in six countries, PV system microprocessor control development activities and PV-hybrid system assessments. The AID project includes a large village system in Tunisia, a water pumping/grain grinding project in Upper Volta, five medical clinics in four countries, PV-powered remote earth station application. These PV activities and summarizes significant findings to data are reviewed. Author

N83-25042*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

SINGLE CELL PERFORMANCE STUDIES ON THE Fe/Cr REDOX ENERGY STORAGE SYSTEM USING MIXED REACTANT SOLUTIONS AT ELEVATED TEMPERATURE

Randall F. Gahn, Norman H. Hagedorn, and Jerri S. Ling 1983 9 p refs Proposed for presentation at 18th Intersoc. Energy Conversion Engr. Conf., Orlando, Fla., 21-26 Aug. 1983

(Contract DE-AI04-80AL-12726)

(NASA-TM-83385; DOE/NASA/12726-21; E-1662; NAS 1.15:83385) Avail: NTIS HC A02/MF A01 CSCL 10C

Experimental studies in a 14.5 sq cm single cell system using mixed reactant solutions at 65 C are described. Systems were tested under isothermal conditions i.e., reactants and the cell were at the same temperature. Charging and discharging performance were evaluted by measuring watt-hour and coulombic efficiencies, voltage-current relationships, hydrogen evolution and membrane resistivity. Watt-hour efficiencies ranged from 86% at 43 ma/sq cm to 75% at 129 ma/sq cm with corresponding coulombic efficiencies of 92% and 97%, respectively. Hydrogen evolution was less than 1% of the charge coulombic capacity during charge-discharge cycling. Bismuth and bismuth-lead catalyzed chromium electrodes maintained reversible performance and low hydrogen evolution under normal and adverse cycling conditions. Reblending of the anode and cathode solutions was successfully demonstrated to compensate for osmotic volume changes. Improved performance was obtained with mixed reactant systems in comparison to the unmixed reactant systems. Author

N83-25043*# Cleveland State Univ., Ohio.

A STUDY OF DYNAMIC ENERGY EQUATIONS FOR STIRLING CYCLE ANALYSIS Final Report

Vincent H. Larson Apr. 1983 44 p refs (Grant NsG-3257)

(NASA-CR-168152; NAS 1.26:168152) Avail: NTIS HC A03/MF A01 CSCL 10B

An analytical and computer study of the dynamic energy equations that describe the physical phenomena that occurs in a Stirling cycle engine. The basic problem is set up in terms of a set o hyperbolic partial differential equations. The characteristic lines are determined. The equations are then transformed to ordinary differential equations that are valid along characteristic lines. Computer programs to solve the differential equations and to plot pertinent factors are described. Author

N83-25044# Iowa State Univ. of Science and Technology, Ames. Dept. of Aerospace Engineering.

PERFORMANCE OF TORNADO-TYPE WIND TURBINES WITH RADIAL INFLOW SUPPLY

C. T. Hsu and H. Ide Sep. 1982 33 p refs Submitted for publication

Avail: NTIS HC A03/MF A01

Wind tunnel tests were conducted for the performance of tornado-type wind turbines with radial inflow supply from the incoming wind. It was shown that the radial inflow supply was necessary for intensifying a vortex in the wind collecting tower and, consequently, for enhancing the power efficiencies. A maximum power efficiency of 3.8 was obtained for a circular-shaped tower as compared to the value of 0.4 for the conventional windmills. Author

N83-25045# Exide Management and Technology Co., Yardley, Pa.

REPORT FOR 1981 ON RESEARCH, DEVELOPMENT AND DEMONSTRATION OF NICKEL-ZINC BATTERIES FOR ELECTRIC VEHICLE PROPULSION Annual Report

Mar. 1982 85 p refs (Contract W-31-109-eng-38)

(ANL/OPEM-81-12) Avail: NTIS HC A05/MF A01

Life testing of a 300 Ah cell was continued using the high rate dc charge and deep discharge at C/3 (100%). To date the cell has completed over 350 cycles, and capacity is still at 90% of nominal level. The four-cell 300 Ah module which was submitted to NBTL for testing failed prematurely because of a hydrogen explosion. This was originally thought to be caused by a material failure, but later testing indicated that a spark caused by a loose nodule of zinc was the cause of failure. A fix for this condition was effected, and no recurrence of this type of failure were seen. Experiments with electrolyte concetration were continued, and extended cycling (over 300 cycles) with higher concentrations of KOH (9M, 10M) resulted in higher capacities over an extended period. Experimental baseline modules (2-cell) based on the EV-106 lead-acid battery footprint and incorporating 1.5 mm interelectrode spacing were built and tested. Author

N83-25046# Argonne National Lab., Ill. Energy and Environment Systems Div.

COMMUNITY ENERGY MANAGEMENT: AN ANNOTATED BIBLIOGRAPHY

M. J. Meshenberg Apr. 1982 98 p (Contract W-31-109-eng-38)

(ANL/CNSV-29) Avail: NTIS HC A05/MF A01

Community plans and studies, background readings in community energy management, and methods and procedures are discussed. Author

N83-25047# EIC, Inc., Newton, Mass.
DEVELOPMENT OF PHOTOELECTROCHEMICAL CELLS BASED ON COMPOUND SEMICONDUCTORS AND NONAQUEOUS ELECTROLYTES Semiannual Report, 1 May - 31 Oct. 1981
R. D. Rauh Mar. 1982 65 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-012700; SERI/PR-8002-7-T4) Avail: NTIS HC A04/MF A01

Electroless chemical bath process optimization for deposition of cadmium chalcogenide thin film photoelectrode; thin film polycrystalline semiconductor photoelectrodes in promising electrolyte systems developed previously; and a device optimization program to scale up high efficiency electrochemical photovoltaic cells are discussed. Author

N83-25048# Lulea Univ. (Sweden). Water Resources Engineering Lulea.
HEAT STORAGE IN ROCK: MULTIPLE WELL SYSTEM
Soeren Andersson (AIB Consulting Engineers, Stockholm, Sweden), Anders Eriksson (AIB Consulting Engineers, Stockholm, Sweden), and Bo Nordell [1982] 15 p refs Presented at the Energy Storage Conf., Seattle, 19-21 Oct. 1981
(Tulea-1981:28; ISSN-0347-0881) Avail: NTIS HC A02/MF A01

The multiple well heat storage system is primarily a seasonal storage. Its function is based on the heat conductivity and storage capacity properties of the rock. The heat is transferred to or from the rock by means of a fluid, normally water, which is circulated through a great number of boreholes or wells. Author

N83-25049# JBF Scientific Corp., Wilmington, Mass.
ANALYSIS OF THE EFFECTS OF INTEGRATING WIND TURBINES INTO A CONVENTIONAL UTILITY: A CASE STUDY Final Report
M. K. Goldenblatt, H. L. Wegley, and A. H. Miller Mar. 1983 64 p refs
(Contract DE-AC06-76RL-01830)
(PNL-1962-Rev) Avail: NTIS HC A04/MF A01

Three aspects of the integration of wind turbine (WTG) into a selected utility generating system, are documented. The sensitivity of the economic impact of WTG to wind speed sampling frequency, wind turbine performance model and wind speed forecasting accuracy are examined. The initial phase of the study consisted of calculating the expected output of the MOD-2 wind turbine using various turbine performance models driven by wind data representing different sampling frequencies. The basic wind data set used consisted of instantaneous values of wind speed and direction recorded at 2 min intervals. Four different simulation methods were used with the wind data to estimate MOD-2 performance. S.L.

N83-25050# Sargent and Lundy, Engineers, Chicago, Ill.
COMPRESSED-AIR ENERGY-STORAGE PRELIMINARY DESIGN AND SITE-DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 7: ENVIRONMENTAL, SAFETY AND LICENSING CONSIDERATIONS Final Report
Dec. 1982 368 p refs Sponsored in part by Electric Power Research Inst.
(Contracts DE-AC02-78ET-29232; ET-78-C-01-2159)
(DE83-005728; EPRI-EM-2351-Vol-7) Avail: NTIS HC A16/MF A01

The suitability of aquifers as compressed air energy storage (CAES) sites was examined. The methodology and results of the study are described. The probability, severity, and recommended control measures for the environmental and safety impacts that could result from the construction and operation of a CAES facility are outlined. The permits and approvals that would be required and the time estimated for their acquisition are also described. DOE

N83-25051# National Academy of Sciences - National Research Council, Washington, D. C.
WORKSHOP REPORT ON BASIC RESEARCH IN ORGANIC GEOCHEMISTRY APPLIED TO NATIONAL ENERGY NEEDS
Jan. 1982 128 p refs Workshop held in St. Petersburg, Fla., 15-17 Dec. 1980 Sponsored in part by DOE
(CONF-801249) Avail: NTIS HC A07/MF A01

The direction and distance of migration of petroleum from the source rocks to reservoir type rocks where petroleum accumulations can come into existence were studied. The biogeochemical and abiotic processes that accompany the formation and breakdown of kerogen and which finally lead to the generation of petroleum, and the depositional model systems which improve the predictive capability of recognizing favorable conditions for hydrocarbon accumulations were also investigated. S.L.

N83-25052# Solar Economics, Inc., Dallas, Tex.
ECONOMIC AND FINANCIAL ANALYSIS OF RESIDENTIAL PHOTOVOLTAIC SYSTEMS. THE IMPACT OF SOLAR PHOTOVOLTAICS ON UTILITIES Final Report
M. T. Katzman and A. C. Katzman Feb. 1982 33 p refs
(Contract DE-AC02-76ET-20279)
(DOE/ET-20279/185) Avail: NTIS HC A03/MF A01

Hourly load data from El Paso Electric and Boston Edison are subjected to preliminary examination by comparison with simulated photovoltaic array output. Three utility production costing and reliability models are compared: SYSGEN, SIMSTOR, and GENCOST. All simulations suggest that photovoltaic penetration will: (1) result in economically significant fuel savings; (2) result in small reductions in capacity requirements; (3) result in total savings that are likely to exceed the costs of photovoltaic systems by the late 1980s. The value of savings per MW of photovoltaics diminishes with increased penetration. Author

N83-25053# Spire Corp., Bedford, Mass.
DESIGN AND FABRICATION OF AIR- AND LIQUID-COOLED PHOTOVOLTAIC/THERMAL COLLECTORS
Michael J. Nowlan Sep. 1981 59 p refs Prepared for Lincoln Lab., MIT, Lexington
(Contract DE-AC02-76ET-20279)
(DOE/ET-20279/162) Avail: NTIS HC A04/MF A01

A liquid type photovoltaic/thermal collector and a photovoltaic cell panel for an air type photovoltaic/thermal collector were constructed. The evelopment of residential photovoltaic/thermal collectors was pursued as an alternative to side by side photovoltaic module and thermal collector systems for applications with high heating loads and limited roof area. The units were designed to demonstrate the feasibillity of high performance photovoltaic/thermal units. S.L.

N83-25054# New Mexico State Univ., Las Cruces. Solar Energy Inst.
DATA REPORT FOR THE SOUTHWEST RESIDENTIAL EXPERIMENT STATION, DECEMBER 1981
M. Lieberman, O. Y. Hai, G. Hocking, and C. Whitaker 29 Jan. 1982 22 p Prepared in cooperation with Lincoln Lab., MIT, Lexington
(Contract DE-AC02-76ET-20279)
(DOE/ET-20279/184) Avail: NTIS HC A02/MF A01

The Residential Experiment Stations of the Solar Photovoltaic Residential Project were designed to develop residential photovoltaic systems and to gather and disseminate performance data. Physical performance data obtained from the photovoltaic energy systems under test are tabulated. S.L.

N83-25055# Lincoln Lab., Mass. Inst. of Tech., Lexington.
DATA REPORT FOR THE NORTHEAST RESIDENTIAL EXPERIMENT STATION, NOVEMBER 1981
M. C. Russell, P. Raghuraman, and P. C. Mahoney Dec. 1981 14 p
(Contract DE-AC02-76ET-20279)
(DOE/ET-20279/182) Avail: NTIS HC A02/MF A01

Physical performance data obtained from photovoltaic energy systems under test are tabulated for November 1981. A.R.H.

N83-25056# Department of Energy, Washington, D. C.
AN ASSESSMENT OF THE BASIC ENERGY SCIENCE PROGRAM. VOLUME 1: TECHNICAL REPORT
Mar. 1982 56 p 2 Vol.
(DOE/ER-0123) Avail: NTIS HC A04/MF A01

An assessment was undertaken of basic energy sciences (BES) program. A randomly selected sample of 129 projects was reviewed by panels of scientific peers. The reviews were conducted by 40 separate panels with an average of four members per panel. The panels rated individual projects on the basis of quality of science, quality of the project team, and probable impact on the mission. All of the ratings in the assessment were on a scale of 0 to 10. For each rating variable, a set of descriptors was provided which defined intervals on the scale. In all cases, the descriptors for 5 to 10 had the sense of project quality ranging from acceptable to outstanding; and descriptors below 5 had the sense of a project having serious deficiencies. These ratings were used to make statistical inferences concerning the BES program. There was substantial uniformity in the judgments of the panel members. The mean of the standard deviations of panel members' ratings of individual projects was less than 1.0 (on the scale of 0-10) for the 129 projects reviewed. S.L.

N83-25057# MCC Associates, Inc., Silver Spring, Md.
PROCEEDINGS OF THE SIXTH ANNUAL THERMAL AND CHEMICAL STORAGE CONTRACTORS' REVIEW MEETING
Feb. 1982 399 p refs Meeting held in Washington, D.C., 14-16 Sep. 1981
(Contract W-7405-eng-26)
(CONF-810940) Avail: NTIS HC A17/MF A01

Chemical/hydrogen energy systems, electrolytic and thermochemical hydrogen production, hydrogen storage/recovery, chemical heat pumps, thermal energy for building heating and cooling and for industrial applications, solar thermal applications, and research are discussed. For individual titles, see N83-25058 through N83-25092.

N83-25058# General Electric Co., Wilmington, Mass. Direct Energy Conversion Programs.
STATUS OF THE DEVELOPMENT OF SOLID POLYMER ELECTROLYTE WATER ELECTROLYSIS FOR LARGE SCALE HYDROGEN GENERATION
J. H. Russell *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 12-15 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Solid polymer electrolyte water electrolysis for large scale hydrogen generation is reported. The program was aimed at performance improvement. Reductions in cell impedance were demonstrated which improve cell performance by over 100 mV. A prototype 500 SCFH system for field evaluation was developed. Author

N83-25059# Life Systems, Inc., Cleveland, Ohio.
STATIC FEED WATER ELECTROLYSIS FOR LARGE SCALE HYDROGEN GENERATION
F. H. Schubert and K. A. Burke *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 22-28 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The static feed water electrolysis concept was evaluated for application to large scale hydrogen generation. The effort addresses four areas: (1) definition of upper current density levels possible with the static feed concept, (2) investigation of operation with contaminated water sources (e.g., seawater), (3) scale up of cell area, and (4) definition of future scale up at the cell stack and system level. The static feed concept and results of each of the four program tasks are presented. Author

N83-25060# Virginia Univ., Charlottesville. Applied Electrochemistry Lab.
SELECTION AND EVALUATION OF MATERIALS FOR ELECTROCHEMICAL ENERGY CONVERSION DEVICES: ELECTROCHEMICAL EVALUATION OF NICKEL WHISKER ELECTRODES
J. D. Hansen, G. E. Stoner, G. L. Cahen, Jr., and L. L. Scribner *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 30-34 ref (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A method was developed and refined to measure effective surface area of planar electrodes. The method yields reproducible and consistent results. Highly accurate determinations of exchange current densities for hydrogen evolution on nickel plates and nickel whiskers indicate that there is no significant difference due to the unique microstructure of whiskers. Supportive evidence for reversible hydrogen absorption into nickel plate and nickel whiskers is obtained by monitoring changes in apparent capacitance during absorption and desorption. Author

N83-25061# Brookhaven National Lab., Upton, N. Y. Dept. of Energy and Environment.
RESEARCH OF ADVANCED ELECTROLYTIC HYDROGEN PRODUCTION
H. S. Isaacs, C. Y. Yang, and J. McBreen *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 35-39 refs (For primary document see N83-25057 14-44)
(Contract DE-AC02-76CH-00016)
Avail: NTIS HC A17/MF A01

Research on advanced electrolytic hydrogen production consisted of two areas. One was the development of an electrochemical method for investigation of the solid polymer electrolyte (SPE) electrocatalyst interface, the other was the development of stable photoanodes for photodecomposition of water by coating low barrier n type semiconductor with a thin film of n type TiO2. By using various types of contact electrodes on SPE membranes, it was possible to use modern electrochemical techniques to investigate the SPE electrocatalyst interface under conditions simulating electrolyzer operation. Low barrier heterojunctions of thin films of n type TiO2 on n type Fe2O3 were successfully demonstrated. Author

N83-25062# General Atomic Co., San Diego, Calif.
THE SULFUR-IODINE THERMOCHEMICAL WATER-SPLITTING CYCLE
G. E. Besenbruch, L. C. Brown, M. Yoshimoto, J. H. Norman, D. R. OKeefe, M. Endo, C. L. Allen, M. L. Kelly, and P. W. Trester *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 44-46 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Major process improvements which had been identified in an earlier phase of this program were investigated and their feasibility demonstrated. The engineering process flowsheet was revised to incorporate the newest process improvements. A potential system for HI purification was investigated which could eliminate the need for the present phosphoric acid treatment completely and would result in significant savings in capital cost for this part of the process. Potential catalysts for the liquid HI decomposition step were evaluated. Noble metals appear to have highest activity, however, attrition of the catalyst occurs. Author

N83-25063# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SOLUBILITY OF SULFUR DIOXIDE IN SULFURIC ACID
Karl K. Chang, Leslie E. Compton, and Daniel D. Lawson *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 52-56 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The solubility of sulfur dioxide in 50% (wt./wt.) sulfuric acid

was evaluated by regular solution theory, and the results verified by experimental measurements in the temperature range of 25 C to 70 C at pressures of 60 to 200 PSIA. The percent (wt./wt.) of sulfur dioxide in 50% (wt./wt.) sulfuric acid is given by the equation %SO2 = 2.2350 + 0.0903P - 0.00026P 10 to the 2nd power with P in PSIA. Author

N83-25064# Battelle Columbus Labs., Ohio. Physical Metallurgy Section.
HYDROGEN COMPATIBILITY OF STEELS c26
J. H. Holbrook, H. J. Cialone, and M. E. Mayfield *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 60-62 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Hydrogen induced subcritical crack growth and hydrogen enhanced fatigue crack growth in steel pipelines and weldments appear to be the most serious material problems to overcome if the underground natural gas pipeline system is to be used for hydrogen transport. The hydrogen compatibility of inline compressors on the system is unknown at this time but could also be a cause for some concern. Author

N83-25065# MPD Technology Corp., Wyckoff, N.J. Ergenics Div.
METAL HYDRIDE PROCESS FOR HYDROGEN RECOVERY c25
E. Lee Huston *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 64-69 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A metal hydride process for the recovery of hydrogen from industrial waste gas streams is being developed. Waste gas streams were surveyed and candidates identified. Hydride impurity interactions were studied as a function of metal hydride former, reaction temperature (0-350 C) impurity species, and impurity concentration. Waste gas pretreatment processes and cost impacts were determined for removal of specific poisons. These results were used as the basis for an initial process design and cost estimate. Author

N83-25066# General Electric Co., Wilmington, Mass.
RECOVERY OF HYDROGEN FROM HYDROGEN SULFIDE c25
Gopala N. Krishnan and Donald L. Hildenbrand *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 71-74 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A process to recover hydrogen from hydrogen sulfide was developed and in which hydrogen sulfide reacts with liquid copper to form cuprous sulfide and hydrogen. In a subsequent step the copper is recovered by oxidizing the sulfide. Preliminary bench scale experiments have shown that the reactions are rapid and approach equilibrium conversions with a gas residence time of a few hundred milliseconds. Author

N83-25067# TRW, Inc., McLean, Va. Energy Engineering Div.
CHEMICAL HEAT PUMP COST EFFECTIVENESS EVALUATION
Warren R. Standley *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 99-105 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The cost-effectiveness and energy-effectiveness of existing chemical heat pump (CHP) concepts is compared with a baseline of conventional energy technologies and a group of near-term emerging energy technologies with which CHPs are expected to compete. The analysis is structured to evaluate these systems functioning as the primary space conditioning unit of both a 'standard' single-family detached home and a 'representative' commercial building. Each HVAC system and application is analyzed in each of two locations in the United States, the southwest (Albuquerque, NM) and the northeast (Boston, MA). In addition, the CHPs are evaluated in a 'representative' industrial waste heat upgrading application, and compared to potentially-competitive technologies for industrial 'heat pumping'. L.F.M.

N83-25068# Southern California Gas Co., Los Angeles.
METAL HYDRIDE/CHEMICAL HEAT PUMP DEVELOPMENT PROJECT
Hector A. Madariaga and David A. Rohy (Solar Turbines, Inc., San Diego, Calif.) *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 107-113 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A mental hydride heat pump (MHHP) is a chemical heat pump containing two different hydrides and using hydrogen as a working fluid for the storage and/or recovery of thermal energy. It utilizes the heat of reaction of hydrogen with specific metal alloys. The MHHP design can be tailored to provide heating and cooling or temperature upgrading over a wide range of input and ambient temperatures. This system can be used with a variety of heat sources including industrial waste heat, solar energy or a fossil fuel. Temperature as low as 130 F can drive the MHHP when a suitable sink is provided. A project is currently underway to develop this unique heat pump for a specific application. The goals of the project include the development of cost effective hydride containers with high heat transfer and low mass; design and fabrication of a laboratory evaluation model; and design and fabrication of a demonstration unit. Extensive component and system test will provide the data for the design processes. Author

N83-25069# Argonne National Lab., Ill.
METAL-HYDRIDE HEAT-PUMP PERFORMANCE STUDIES
H. F. Abelson and J. M. Clinch *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 115-121 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Expressions for the coefficient of performance (COP) were developed for both heating and cooling by a multi-tube, metal-hydride heat pump that employs regenerative heat exchange. Theoretical upper bounds on the COP were established and the sensitivity of the heating COP to variations in key system parameters was determined. The COP was estimated for a baseline design and potential design improvements were explored. Author

N83-25070# North Carolina State Univ., Raleigh. Dept. of Materials Engineering.
EVALUATION OF OLIVINE REFRACTORIES FOR TES
B. M. Gay, R. L. Cochrane, H. Palmour, III, and M. J. Paisley *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 142-146 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The principal objectives of this program are to (1) experimentally determine the degree of improvement in thermal and mechanical performance that can be obtained with an olivine thermal storage brick made of domestic materials using advanced processing techniques compared with state-of-the-art as represented by commercial European bricks, (2) conduct an assessment of existing German ceramic process technology and determine its adaptability to domestic raw materials and manufacturing practices, and (3) investigate, on a limited basis, method for further improvement of domestic-olivine brick. To date, accomplishments include (1) installation of improved, computer-based instrumentation, (2) the use of this system to determine performance characteristics of a set of heat storage refractories under cyclic use conditions, (3) acquisition of the services of a knowledgeable European consultant, (4) continued lab-scale process/property optimization studies, and (5) comparative testing of olivine-based and magnesite-based heat storage refractories in the calorimetric test facility at Purdue University. L.F.M.

N83-25071# TRW, Inc., Oak Ridge, Tenn. Energy Development Group.
ALTERNATIVES TO CERAMIC BRICKS AND CERAMIC BRICK

SYSTEMS
Michael MacDonald and David Goldenberg *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 148-154 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Low-cost, alternative materials were evaluated, including monolithic and loose-fill materials. Monolithic materials were ruled out due to cost. Several loose-fill candidate materials were identified and their properties established. A conceptual electric storage furnace system was developed to take advantage of using the loose-fill materials in a packed bed configuration. An existing computer code for calculating one dimensional temperature profiles of the gas and the solid in a packed bed TES system was modified and updated to allow the charging, discharging, and idle modes of operation of the proposed furnace system to be modeled. Existing research on heat transfer coeffients, pressure drops, and system modeling was reviewed, and appropriate information incorporated in the updated computer code. Numerous runs involving an eight hour charge period followed by 16 hours of alternating discharge and idle periods have been made. The performance of the packed bed furnace system has been established. Fabricatioon and materials costs for the components of the proposed furnace system are being obtained from local manufacturers and suppliers. System components requiring further development have been identified. Research required for the advancement of this concept has also been identified. L.F.M.

N83-25072# Argonne National Lab., Ill. Special Projects Group.
FIELD EVALUATION AND ASSESSMENT OF THERMAL ENERGY STORAGE FOR RESIDENTIAL SPACE HEATING Interim Report
Herb Hersh *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 161-165 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A data base was developed based on two heating seasons and 45 test and 30 control homes in Maine and Vermont. Based on first analysis of monitored temperatures and electrical energy used for space heating, fuel bills and reports of users and utilities, the technical performance of TES ceramic and hydronic systems is deemed to be technically satisfactory and there is a high degree of customer acceptance and positive attitudes towards TES. Analysis of house data shows a high degree of variability in electric heat energy demand for a given degree-day. An analysis is underway to investigate relative differences in the efficiency of electricity utilization of storage and direct heating devices. The much higher price of storge systems relative to direct systems is an impediment to market penetration. A changing picture of rate structures may encourage direct systems at the expense of storage systems. L.F.M.

N83-25073# Argonne National Lab., Ill. Energy and Environmental Systems Div.
ASSESSMENT OF COOL STORAGE IN COMMERCIAL BUILDING APPLICATIONS
J. G. Asbury, J. M. Calm, and R. F. Giese *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 166-175 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

As part of its storage assessment program, Argonne National Laboratory is evaluating cool storage technologies for electric load leveling in commercial building applications. Analysis of conventional chilled water and ice storage systems indicate that paybacks of less than four years are available under the partial storage, or load leveling, mode of operation. Storage systems with sufficient capacity to eliminate on-peak chiller operations entail larger initial capital outlays and longer paybacks under existing commercial-class electric rate schedules. Improved performance and lower costs could be achieved through R&D to improve the match between the storage and the chiller systems and through development of improved latent heat systems. Author

N83-25074# Pennwalt Corp., King of Prussia, Pa. Central Research and Development.
PELLETIZATION AND ROLL ENCAPSULATION OF PHASE CHANGE MATERIALS
Johnson Chen, Robert Nelson, and F. X. Polinski *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 177-184 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Based on the criteria of high latent heats of fusion, low cost, and ease of pelletization, seven phase change materials (PCM's) with melting points in the ranges suitable for absorption cooling, active heating, and passive space conditioning applications have been pressed into pellets about 12 mm in diameter and then encapsulated with organic coating materials by a roll coating process. Capsules of four of the seven PCM candidates have shown retention of integrity in various aqueous heat exchange fluids in accelerated thermal cycling tests ranging between 1500 to 2900 heating and cooling cycles. Capsules of PCM's melting near room temperature have also shown good stability in laboratory air environment. The objective of this effort is to develop reliable and cost effective PCM's for use in: (1) active heat exchange packed bed assemblies of simple design that are capable of providing heat exchange efficiency and storage capacity superior to those of conventional heat storge systems, and (2) passive heat storage systems consisting of building products incorporating thermal energy storage materials. The feasibility of this approach is supported by a favorable cost analysis. Author

N83-25075# CALMAC Mfg. Co., Englewood, N. J.
EFFECT OF ADDITIVES ON PERFORMANCE OF HYDRATED SALT TES SYSTEMS
Calvin D. MacCracken *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 186-188 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A gelling agent, developed by Calor, Ltd. of England is evaluated; as a means of preventing stratification in sodium thiosulfate pentahydrate and Glauber salt eutectic phase change materials; to determine techniques for the field filling and to develop repair procedures for systems incorporating the Calor gel; to study the effects of ethylene glycol and glycerin on the thermal performance of sodium thiosulfate pentahydrate and Glauber salt eutectic PCM; and to evaluate the effect of pH modification of sodium thiosulfate pentahydrate, specifically with regard to subcooling behavior. Author

N83-25076# Aerospace Corp., Germantown, Md.
ASSESSMENT OF ENERGY STORAGE FOR SOLAR APPLICATIONS
David J. Edwards and Solomon Rosenzweig *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 194-200 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The first three phases of the Solar Applications Analysis for Energy Storage study performed for the Office of Advanced Conservation Technologies of the Department of Energy is presented. Phase 1 surveyed solar energy applications, phase 2 developed a uniform methodology for assessments, and phase 3 summarized prior applicable storage assessments. Three referenced reports thoroughly cover each of the phases and are available from the authors. Author

N83-25077# Kalamazoo Coll., Mich. Dept. of Chemistry.
MODELING HEAT TRANSFER IN PCM'S WITH THE BUDAK METHOD
Ralph M. Deal and Jo Ann Millard *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 202-204 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A simple numerical procedure for calculating the flow of heat in a one dimensional phase change material developed by Budak was tested against an analytical solution to determine the best choice of parameters for a range of Stefan numbers. Simple rules are provided by which an inexperienced user of the method can obtain reasonably reliable results for a simply melting substance. Author

N83-25078# Argonne National Lab., Ill.
DEVELOPMENT OF NATURAL STRATIFICATION TECHNOLOGY
Roger L. Cole and Frank O. Bellinger *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 224-230 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The development of natural stratification of water in sensible heat storage tanks is studied, and comparisons of experimental data with diffusion theory equations are made. A simple 1-D model of stratification that gives a good results is presented and verified with measured tank performance. A stratification index is introduced that allows a rapid comparison to be made of tank performance data. A semi-empirical equation is given that will allow a prediction to be made regarding the tank operating performance providing that an empirical constant related to the mixing heights may be evaluated. A method to estimate a value for the constant is given for the case of a tank with a side inlet and outlet. Implications of stratification in regard to overall system control strategy are discussed. The goal is to provide system designers with the guidelines necessary to assure the establishment and maintenance of stratification and to take advantage of it. Author

N83-25079# Oak Ridge National Lab., Tenn. Nuclear Div.
MATHEMATICAL MODELING OF TES SUBSYSTEMS
Alan D. Solomon *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 239-241 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Results of research into phase change models for latent heat storage are described. These are of both a simulation and analytical nature and continue the work of past years in this effort. Author

N83-25080# Rocket Research Corp., Redmond, Wash.
APPLICATION OF THERMAL ENERGY STORAGE TO PROCESS HEAT RECOVERY. PHASE 3: HEAT EXCHANGER EVALUATION
L. B. Katter *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 246-248 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The use of thermal energy storage to improve the utilization of reject process heat as a source of energy for a district heating system was investigated. The specific energy source studied is the aluminum reduction process. The energy supply in an aluminum plant is continuous and constant, 24 hours per day, 365 days per year. The energy demand in a district heating system is highly cyclical, on a diurnal basis, an annual basis, and a third cyclical variation in demand is found in the weekly use patterns. Thermal energy storage improves the cost-effectiveness of investments in energy recovery and distribution equipment and decreases the need for supplemental fuel for the district heating system. Author

N83-25081# Edde (Howard), Inc., Bellevue, Wash.
TES TECHNOLOGY TRANSFER IN THE PULP AND PAPER INDUSTRY
Howard Edde and Jay Handley *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 257-261 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Thermal energy storage (TES) is a technique whereby energy is temporarily stored in order to more uniformly balance steam generation with steam demands. The pulp and paper industry accomplishes this in an accumulator using hot water or steam as the transfer medium. An international study was conducted which showed that TES is presently more universally practiced in Scandinavian mills than in U.S. mills. However, TES offers significant benefits in energy conservation, provides an instant steam reserve to stabilize mill steam demand, prolongs power boiler life, and permits displacement of oil with potentially less expensive and more abundant alternative fuels. The capital pay back time (PBT) is two to three years with return on investment (ROI) of 30 to 50 percent. Projections indicate that installed TES system will become increasingly common in U.S. mills in the near future. Author

N83-25082# Institute of Gas Technology, Chicago, Ill.
ADVANCED HIGH-TEMPERATURE THERMAL ENERGY STORAGE MEDIA FOR INDUSTRIAL APPLICATIONS
T. D. Claar and R. T. Waibel *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 263-268 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

An advanced thermal energy storage media concept based on use of carbonate salt/ceramic composite materials is being developed for industrial process and reject heat applications. The composite latent/sensible media concept and its potential advantages over state of the art latent heat systems is described. Media stability requirements, on-going materials development efforts, and planned thermal energy storage (TES) performance evaluation tests are discussed. Author

N83-25083# Martin Marietta Aerospace, Denver, Colo.
MOLTEN SALT THERMAL ENERGY STORAGE SUBSYSTEM FOR SOLAR THERMAL CENTRAL RECEIVER PLANTS
Philip B. Wells and George P. Nassopoulos (American Technigaz, Inc., Hingham, Mass.) *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 279-285 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The development of a low cost thermal energy storage subsystem for large solar plants is described. Molten nitrate salt is used as both the solar plant working fluid and the storage medium. The storage system consists of a specially designed hot tank to hold salt at a storage temperature of 839K (1050 deg F) and a separate carbon steel cold tank to hold the salt after its thermal energy has been extracted to generate steam. The hot tank is lined with insulating firebrick to reduce the shell temperature to 561K (550 deg F) so that a low cost carbon steel shell is used. The internal insulation is protected from the hot salt by a unique metal liner with orthogonal corrugations to allow for numerous cycles of thermal expansion and contraction. A preliminary design for a large commercial size plant (1200 MWh sub +), a laboratory test program for the critical components, and the design, construction, and test of a small scale (7 MWH sub t) research experiment at the Central Receiver Test Facility in Albuquerque, New Mexico is described. Author

N83-25084# Norges Tekniske Hoegskole, Trondheim. Inst. of Inorganic Chemistry.
THERMAL CONDUCTIVITY OF MOLTEN ALKALI NITRATES
Bjorn Hafskjold and Harald A. Oye *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 287-293 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A method for simultaneous determination of the thermal conductivity and thermal diffusivity of fluids was evaluated. The method is based on the transient heat conduction following a step wise heat generation in a strip of metal foil immersed in the field. It is an absolute method since no calibration constant is involved. equipment is built capable of measuring molten nitrates in their stable liquid temperature range under a controlled atmosphere. E.A.K.

N83-25085# Ko (Kenneth C.) and Associates, Denver, Colo.
EFFECTS ON SOILS FROM HOT STORAGE TANKS
Kenneth C. Ko *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 302-307 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Behavioral characteristics of foundation soils for hot storage tanks were investigated on two soil models representative of the soils in the Continental U.S. The changes in the engineering properties of the foundation soils due to heating and the effects of four storage media liquids; hydrocarbon oil, silicon oil, molten nitrate salt and liquid sodium into the foundation were investigated. The remedial measures such as soil preconditioning to alleviate the detrimental effects of the heat on soils are presented and the areas for further research are delineated. E.A.K.

N83-25086# Babcock and Wilcox Co., Lynchburg, Va. Advanced Energy Systems.
CONCEPTUAL DESIGN OF THE MOVING BED THERMAL ENERGY STORAGE SYSTEM FOR A COMMERCIAL SCALE (100 MWe) SOLAR CENTRAL RECEIVER POWER PLANT
R. L. Wright, T. P. Suchocki, and D. C. Schluderberg *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 309-316 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A conceptual design was developed for an advanced thermal energy storage system which is applicable to a 100 MWe solar central receiver plant using water/steam as the working fluid. Operating conditions studied were 510C/10.1 MPa from the receiver and 299C/2.72 MPa from storage. The concept offers potential for cost and performance improvements over the oil/rock concept which is installed at the central receiver 10 MWe pilot plant under construction. The moving bed thermal energy storage system (MBTESS) uses a free flowing refractory material as the heat transport and storage media. Cost and performance, are estimated. E.A.K.

N83-25087# Combustion Engineering, Inc., Windsor, Conn. Advanced Development Dept.
CONCEPTUAL DESIGN OF A LATENT HEAT THERMAL ENERGY STORAGE SUBSYSTEM FOR A SATURATED STEAM SOLAR RECEIVER AND LOAD
Gerald F. diLauro and Richard E. Rice (Comstock and Wescott, Inc., Cambridge, Mass.) *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 318-322 ref (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The conceptual design of a tube intensive latent heat thermal energy storage (TES) subsystem which utilized a eutectic mixture of sodium hydroxide and sodium nitrate as the phase change material (PCM) was developed. The charging and discharging of the unit is accomplished by the same serpentine tube bundle heat exchanger in which heat transfer is augmented by aluminum channels acting as fins. Every tenth channel is made of steel to provide tube support. E.A.K.

N83-25088# Sandia Labs., Albuquerque, N. Mex. Fluid and Thermal Sciences Dept.
SINGLE MEDIA THERMOCLINE TES STUDIES AT SANDIA NATIONAL LABORATORIES
Robert J. Gross *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 323-329 refs (For primary document see N83-25057 14-44) (SAND-81-1868C) Avail: NTIS HC A17/MF A01

The status of thermocline thermal energy storage (TES) development is summarized. The work centers around testing in the 1200 gal engineering prototype thermocline test facility. The results of heat loss, charge, discharge and static tests in the prototype tank are described. Also described are analytical work and a supportive laboratory scale program which is investigating diffusers to inhibit mixing in the tank. S.L.

N83-25089# AiResearch Mfg. Co., Torrance, Calif.
APPLICATION OF BUFFER THERMAL ENERGY STORAGE TO AN AIR BRAYTON SOLAR ENGINE
Hal J. Strumpf and Kevin P. Barr *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 341-349 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

The application of latent heat buffer thermal energy (TES) storage to a point focusing solar receiver equipped with an air Brayton engine is discussed. The 85-kw(th) Air Brayton Solar Receiver (ABSR) and Mod 'O' engine were used as a baseline system. The operating life of a Brayton engine depends, in general, upon the number of start-stop cycles. The main advantage of buffer thermal energy storage is that it enables the engine to continue running during periods of cloud cover, thus reducing the number of engine shutdowns and increasing engine life. To demonstrate the effect of buffer thermal energy storage on engine operation, a computer program was written for complete transient/steady/state Brayton cycle performance. The solar insolation input was minute by minute data. The results indicated that thermal storage can afford a significant decrease in the number of engine shutdowns as compared to operating without thermal storage. It was also found that the number of shutdowns does not continuously decrease as the storage material weight increases. In fact, there appears to be an optimum weight for minimizing the number of shutdowns. It was also indicated that the economic viability of buffer thermal energy storage is largely a function of the achievable engine life. At low predicted life, thermal storage is economically attractive; for highly reliable, long lived engines, thermal storage is not economical. S.L.

N83-25090# Stearns-Roger Corp., Denver, Colo.
COST AND PERFORMANCE OF THERMAL STORAGE CONCEPTS IN SOLAR THERMAL SYSTEMS
A. W. McKenzie *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 360-364 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

Consistently calculated cost data was calculated, realistic performance data developed, and projected and for a mature technology for several thermal storage concepts integrated into several solar thermal systems. Available thermal storage concepts were reviewed. A screening criteria was developed which when applied, resulted in forty systems being judged suitable for further study. Schematics were made for these systems, quantities were established, and from these rough order of magnitude costs were determined. Based upon those costs, candidate systems were further reduced. The remaining twenty systems were then more fully developed. A technical review was held and the results of that review incorporated. The storage ranges were expanded with further costing refinements being applied. The results of the thermal storage analysis was documented. S.L.

N83-25091# Grumman Aerospace Corp., Bethpage, N.Y.
HIGH TEMPERATURE ACTIVE HEAT EXCHANGER RESEARCH FOR LATENT HEAT STORAGE
J. Alario and R. Haslett *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 377-382 (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

An active heat exchange method in a latent heat (salt) thermal energy storage system that prevents a low conductivity solid salt layer from forming on heat transfer surfaces was developed. An evaluation of suitable media with melting points in the temperature range of interest (250 to 400 C) limited the candidates to molten salts from the chloride, hydroxide and nitrate families, based on high storage capacity, good corrosion characteristics and availability in large quantities at reasonable cost. The specific salt recommended for laboratory tests was a choride eutectic (20.5KCL o 24.5NaCL o 55.MgCl2% by wt.), with a nominal melting point of 385 C. Various active heat exchange concepts were given a

technical and economic comparison to a passive tube shell design for a reference application (300 MW sub t for 6 hours). Test hardware was then built for the most promising concept: a direct contact heat exchanger in which molten salt droplets are injected into a cooler counter flowing stream of liquid metal carrier fluid (lead/Bismuth). S.L.

N83-25092# Washington Univ., Seattle. Aerospace and Energetics Research Program.
HIGH TEMPERATURE INTEGRATED THERMAL STORAGE FOR SOLAR THERMAL APPLICATIONS
Adam P. Bruckner, Abraham Hertzberg, and Robert T. Taussig (Mathematical Sciences Northwest, Bellevue, Wash.) *In* MCC Associates, Inc. Proc. of the 6th Ann. Thermal and Chem. Storage Contractors' Rev. Meeting Feb. 1982 p 384-389 refs (For primary document see N83-25057 14-44)
Avail: NTIS HC A17/MF A01

A high temperature (1500 to 2000 K) heat transfer and storage system for solar thermal applications is described. A silica glass in bead form is melted in a solar receiver and stored in a large, refractory lined vessel. The molten glass is available for later discharge in a direct contact droplet heat exchanger, where a working gas is heated and solid glass beads are formed for recycle. The very low cost of the storage material makes the energy related unit capital cost of this storage system an order of magnitude lower than that of the nearest competing concept. S.L.

N83-25093# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
COMMERCIAL PHOTOVOLTAICS MEASUREMENTS WORKSHOP PROCEEDINGS
Harry A. Schafft, ed. (NBS, Washington, D.C.) and Steven Hogan, ed. 1981 294 p refs Workshop held in Vail, Colo., 27-29 Jul. 1981 Sponsored by DOE
(SERI/CP-214-1403) Avail: NTIS HC A13/MF A01

Measurements equipment needs, interaction with customer, source for reference cells, cell and module output measurements, quality assurance, silicon materials characterization, solar irradiance data, and photovoltaic module certification are discussed. For individual titles, see N83-25094 through N83-25111.

N83-25094# Spectrolab, Inc., Sylmar, Calif.
PHOTOVOLTAIC MEASUREMENT EQUIPMENT NEEDS. VIEW OF A PROSPECTIVE SUPPLIER
Eugene L. Ralph *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 30-40 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

A large family of light sources suitable for testing solar cells and solar cell modules was developed. The type of equipment that is available and some of the deficiencies that exist are discussed. Author

N83-25095# Spire Corp., Bedford, Mass.
PHOTOVOLTAIC MEASUREMENT EQUIPMENT NEEDS. VIEW OF A SUPPLIER
Roger G. Little *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 41-59 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Materials and device characterization, incoming material QC, in process QC, crack detection, interconnect integrity, circuit continuity, electrical insulation, module open/short circuits, diode failures, and insolation are discussed. Author

N83-25096# Texas Instruments, Inc., Dallas. Central Research Labs.
THE USE OF TEST STRUCTURES FOR RELIABILITY PREDICTION AND PROCESS CONTROL OF INTEGRATED CIRCUITS AND PHOTOVOLTAICS
Isaac Trachtenberg *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 83-88 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

How a reliability model might be developed with new data from accelerated stress testing, failure mechanisms, process control monitoring, and test structure evaluations is illustrated. The effects of the acceleration of temperature on operating life is discussed. Test structures that will further accelerate the failure rate are discussed. Corrosion testing is addressed. The uncoated structure is encapsulated in a variety of mold compounds and subjected to pressure-cooker testing. Author

N83-25097# Chevron Research Co., Richmond, Calif. Solar Energy Div.
SOME ERROR SOURCES IN ELECTRICAL TEST ELEMENTS FOR THIN-FILM SOLAR CELLS
David E. Sawyer *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 89-94 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Electrical test elements can be an important aid for solar cell design, process control, and failure and degradation-mode studies. An analysis of two of the most useful ones was performed; the top-region sheet resistance test element, and the metallization to top-region contact resistance test element. The results show that significant measurement errors may occur, particularly for thin-film cells which have a high top-region sheet resistance and appreciable zero-bias junction conductance. Correction factors for these cases were obtained. Author

N83-25098# Applied Solar Energy Corp., City of Industry, Calif.
DIFFUSION LENGTH MEASUREMENT AND SILICON QUALITY
Peter A. Iles *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 109-119 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Comments are presented based on experience in fabricating high efficiency cells, and on several years evaluation of almost all available forms of crystalline silicon ingots or ribbons. The evaluation was based on a conservative baseline cell process sequence, which for each form of silicon provided realistic comparisons with the other forms, and also traced chronological changes in the silicon growth methods. The evaluation measurements included illuminated I-V data, backed-up by measurements of diffusion length, spectral response, dark I-V data (forward and reverse bias), and often by light spot scanning. Author

N83-25099# Motorola, Inc., Phoenix, Ariz. Semiconductor Group.
ROLE OF IMPURITIES IN SILICON SOLAR CELL PERFORMANCE
Nick G. Sakiotis *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 121-130 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The impurity content of a silicon substrates imposes an upper limit to the performance of solar cells fabricated upon the substrated. The severity of the imposed limit depends upon the kinds, concentrations and distributions of the impurities and upon their electronic state within the lattice. The sensitivity of solar cell performance parameters to the concentration of some impurities and the manner in which impurities degrade solar cell performance are addressed. Author

N83-25100# SES, Inc., Newark, Del.
SUMMARY OF SOLAR IRRADIANCE DATA SESSIONS
William J. Kaszeta *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 131-136 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Two main uses of pyranometers and pyrheliometers, measurement of insolation (energy) and irradiance (power); the total error (uncertainty) for a good pyranometer used for insolation monitoring; pyranometer measurements of irradiance, the intercomparison and

calibration of pyrheliometers; and standards pertaining to solar radiation are discussed. Author

N83-25101# Eppley Lab., Inc., Newport, R.I.
SOLAR RADIOMETERS
Frank J. Griffin *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 137-148 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Solar radiation instrumentation is described. The characteristics of pyrheliometers and pyranometers are discussed. Author

N83-25102# National Oceanic and Atmospheric Administration, Boulder, Colo. Solar Radiation Facility.
ACCURACY OF PYRANOMETER CALIBRATIONS AND PYRANOMETER CHARACTERIZATION
Ed C. Flowers *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 149-152 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Error estimates for various types of pyranometers separated according to the calibration methods used at the NOAA solar radiation facility are listed. A small group reference and control pyranometers are calibrated by an absolute cavity radiometer by the shade transfer method and this transfer is indicated. A pyranometer calibrated by this method is used to calibrate large groups of pyranometers by side by side comparisons in sunlight. In the second method about 10-14 days (sunrise to sunset) are compared to obtain a calibration value for the test instrument. DOE

N83-25103# DSET Labs., Inc., Phoenix, Ariz.
SPECTRORADIOMETER MEASUREMENTS IN SUPPORT OF PHOTOVOLTAIC DEVICE TESTING
Gene A. Zerlaut and J. D. Maybee *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 153-166 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The spectroradiometer which is capable of complete solar spectral measurements approximately 7 minutes apart in both the global and direct beam modes, all in the wavelength range 280 to 2500nm, is outlined. Global can be measured at any azimuth and altitude position; the field of view of the pyrheliometer comparison tube is 6 deg. It is shown that resolution is sufficient to identify Fraunhofer absorption bands in the surface of the Sun. The relationship between direct beam spectra and two specific microenvironments is shown. The differences for the significance of microenvironment haze and pollution to the efficiency of concentrating photovoltaic devices are analyzed. E.A.K.

N83-25104# Midwest Research Inst., Golden, Colo.
TERRESTRIAL SOLAR SPECTRAL MODELING
R. E. Bird *In its* Com. Photovoltaics Meas. Workshop Proc. 1981 p 171-182 refs Original document was announced as N82-15664 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The utility of accurate computer codes for calculating the solar spectral irradiance under various atmospheric conditions was recognized. New absorption and extraterrestrial spectral data are introduced. Progress is made in radiative transfer modeling outside of the solar community, especially for space and military applications. Three rigorous radiative transfer codes SOLTRAN, BRITE, and FLASH are employed. The SOLTRAN and BRITE codes are described and results from their use are presented. E.A.K.

N83-25105# DSET Labs., Inc., Phoenix, Ariz.
THE CALIBRATION OF PYRHELIOMETERS AND PYRANOMETERS FOR TESTING PHOTOVOLTAIC DEVICES
Gene A. Zerlaut *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 183-193 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The status of pyranometer and pyrheliometer calibration techniques was reviewed. The intercomparison of absolute cavity pyrheliometers is discussed. A round robin experiment performed to isolate various aspects of calibration methods suggests that a much more rigorous approach is required for calibrations of pyranometers to be employed in solar device testing. Tilt effects, however small, deviation from cosine law, and temperature related responsivity, can cause errors in the assessment of efficiency of solar devices. The importance of absolute cavity pyrheliometer intercomparisons, is demonstrated. E.A.K.

N83-25106# Solar Power Corp., Woburn, Mass.
SOURCE FOR REFERENCE CELLS
Richard R. Addiss, Jr. *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 195-200 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The development of a consensus to establish a source of reference cells is discussed. To do this both the technical and institutional barriers which may exist, and what needs to be done to overcome these are considered. Potential problems are identified. The need for defining standard illumination of conditions is outlined. The ability to measure electrical outputs under nonstandard illumination conditions which allow the results to be related to standard conditions is discussed. The most effective way to do this is to use a properly calibrated reference cell which has a suitable spectral response. The calibration of these reference cells must be performed by an independent, impartial, reliable organization which ensures that all reference cells in use throughout the industry have their calibration based on the same accepted standard conditions. E.A.K.

N83-25107# National Bureau of Standards, Washington, D.C.
AN APPROVED LABORATORY PROGRAM FOR PHOTOVOLTAIC REFERENCE CELL DEVELOPMENT
Douglas B. Thomas *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 201-204 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The search for a laboratory program to provide a source of photovoltaic reference cells and to identify at least one laboratory which is competent to fabricate, calibrate, and certify reference cells was investigated. The evaluation of candidate laboratories and selection of the best qualified to serve as an approved laboratory for providing reference cells is discussed. These reference cells are used in the measurement of the electrical output of solar cells and modules. E.A.K.

N83-25108# DSET Labs., Inc., Phoenix, Ariz.
PROGRESS IN THE DEVELOPMENT OF STANDARD PROCEDURES FOR THE GLOBAL METHOD OF CALIBRATION OF PHOTOVOLTAIC REFERENCE CELLS
Richard D. Whitaker, Arthur W. Purnell, and Gene A. Zerlaut *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 205-219 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The defining of an efficient and accurate procedure for calibration of photovoltaic reference cells by the global method is discussed. A range of the pertinent atmospheric parameters are sampled in experiments which characterize reference cells by at least two different methods using hemispherical illumination. An altazimuth mount to maintain stable solar radiation on silicon reference cell test samples is utilized. The desirability of the global calibration procedure is confirmed. Limitations of the method are identified. The complete experimental plan is described. E.A.K.

N83-25109*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SOLAR CELL MEASUREMENTS
Henry B. Curtis *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 227-233 (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01 CSCL 10A

The measurement of the electrical performance characteristics of individual solar cells is discussed. One of the reasons is determination of the output power, measurement of the effect of various degradation mechanisms, and separation of cells by current and voltage for eventual use in series and parallel combinations. Major problem areas in making accurate performance measurements are the determination of the irradiance level during measurement, the measurement and control of cell junction temperature, and the contacting of the separate current and potential leads to the cell under test. Solar cells respond to only part of the solar spectrum, irradiance measurement made with blackbody detectors lead to spectral mismatch errors. The use of reference cells with a spectral response similar to that of the test cell reduces this error. Reference cells are calibrated at standard atmospheric conditions with all cells calibrated at the same conditions. E.A.K.

N83-25110# Pacific Northwest Lab., Richland, Wash. Electro-Optic Systems.
SPECTRAL RESPONSE MEASUREMENTS FOR SOLAR CELLS
John S. Hartman and M. A. Lind *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 235-242 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

Spectral response measurements, measurement systems, and potential measurement problems relative to the characterization of solar cells are presented. Measurement systems are outlined for determining the spectral response, external quantum efficiency, and internal quantum efficiency of solar cells. Practical system components and measurement systems are presented along with their potential advantages and weaknesses. Several solar cell properties which must be considered before a measurement system can be designed to evaluate a specific type of solar cell are discussed. E.A.K.

N83-25111# SES, Inc., Newark, Del.
DEVELOPMENT OF A STANDARD TEST METHOD FOR MEASURING PHOTOVOLTAIC CELL PERFORMANCE. A STATUS REPORT
Udo C. Pernisz *In* Midwest Research Inst. Com. Photovoltaics Meas. Workshop Proc. 1981 p 243-250 refs (For primary document see N83-25093 14-44)
Avail: NTIS HC A13/MF A01

The development of a standard method for the measurement of the electrical performance of photovoltaic devices which were used on space simulation and applications of space technology is described. A draft document was copied from a report on terrestrial photovoltaic measurement procedures. Measurement procedures are discussed. The photovoltaic power system and standard writing activities are proceeded with the objective of reaching standard methods for measuring the electrical performance of photovoltaic devices. E.A.K.

N83-25112*# Communications Satellite Corp., Clarksburg, Md.
DEVELOPMENTS TOWARD AN 18% EFFICIENT SILICON SOLAR CELL Final Report
A. Meulenberg, Jr. Apr. 1982 142 p refs
(Contract NAS3-22217)
(NASA-CR-168141; NAS 1.26:168141) Avail: NTIS HC A07/MF A01 CSCL 10A

Limitations to increased open-circuit voltage were identified and experimentally verified for 0.1 ohm-cm solar cells with heavily doped emitters. After major reduction in the dark current contribution from the metal-silicon interface of the grid contacts, the surface recombination velocity of the oxide-silicon interface of shallow junction solar cells is the limiting factor. In deep junction solar cells, where the junction field does not aid surface collection, the emitter bulk is the limiting factor. Singly-diffused, shallow junction cells have been fabricated with open circuit voltages in excess of 645 mV. Double-diffusion shallow and deep junctions cells have displayed voltages above 650 mV. MIS solar cells formed on 0.1 ohm-cm substrates have exibited the lowest dark currents produced in the course of the contract work. Author

N83-25113# Raytheon Co., Bedford, Mass. Missile Systems Div.
POWER CONDITIONING SUBSYSTEM DESIGN Final Report, 17 Sep. 1979 - 31 Aug. 1982
John J. Moriarty, Paul A. Corbiere, and Stanley Casazza Wright-Patterson AFB, Ohio AFWAL Nov. 1982 40 p refs
(Contract F33615-79-C-2079; AF Proj. 3145)
(AD-A124191; AFWAL-TR-82-2108; BR-13539) Avail: NTIS HC A03/MF A01 CSCL 10/2

This final report describes the results of a 3 phase program to provide designs of lightweight, low volume power conditioning subsystems in the range of 500 kilowatts (kW) to 30 megawatts (MW) as part of the Air Force exploratory development program in high power airborne electrical power supply technology. These designs are based on presently available component technology such as solid state switching devices, newly developed thyratrons and high energy density capacitors. Although these subsystems are to be operated in a burst mode, active cooling concepts have been utilized wherever they would result in an advantage in weight or volume. GRA

N83-25114# Naval Academy, Annapolis, Md. Dept. of Naval Systems Engineering.
PERFORMANCE OPTIMIZATION OF A PNEUMATIC WAVE ENERGY CONVERSION DEVICE Final Report, 1981 - 1982
Stephen W. Surko 26 Aug. 1982 83 p refs
(AD-A124295; USNA-TSPR-120) Avail: NTIS HC A05/MF A01 CSCL 10/2

The purpose of this study was, for the first time, to optimize the performance of a pneumatic wave energy conversion device. The experiments of Jolly and Newmaster (1979) and Trop and Casey (1980) left a capture chamber and turbine for further investigation. To optimize the system performance the turbine had to be first analyzed so that its power performance curves could be determined. These curves were needed to help define the possible overall performance of the system, and for the impedance matching of the system necessary for performance optimization. With this knowledge, an appropriate generator was purchased and a generator-turbine linkage designed and built. The completed system was then analyzed in the 380 ft wave tank at the U.S. Naval Academy to establish its optimum performance. From the research it is clear that pneumatic wave energy conversion is a promising concept. With several hundred of these devices situated some 100 km off the coast of the Pacific Northwest each device would be producing from 50 to 200 kW which would be transferred back to shore. GRA

N83-25115# California Univ., Livermore. Lawrence Livermore Lab.
ENERGY AND TECHNOLOGY REVIEW
Nov. 1982 38 p refs
(Contract W-7405-eng-48)
(DE83-003802; UCRL-52000-82-11) Avail: NTIS HC A03/MF A01

Large-block experiments in underground coal gasification, the regional seismic test network, and tandem mirror devices are discussed. For individual titles, see N83-25116 through N83-25118.

N83-25116# California Univ., Livermore. Lawrence Livermore Lab.
LARGE-BLOCK EXPERIMENTS IN UNDERGROUND COAL GASIFICATION
In its Energy and Technol. Rev. Nov. 1982 p 1-13 refs (For primary document see N83-25115 14-44)
Avail: NTIS HC A03/MF A01

The experiments were conducted in a 7.6 m thick subbituminous coal seam at a relatively shallow depth of 48 m. Author

N83-25117# California Univ., Livermore. Lawrence Livermore Lab.
THE REGIONAL SEISMIC TEST NETWORK
Steven R. Taylor *In its* Energy and Technol. Rev. Nov. 1982

p 14-23 refs (For primary document see N83-25115 14-44)
Avail: NTIS HC A03/MF A01

The performance of a regional seismic-detection network that simulates anticipated conditions in the Soviet Union is addressed. Author

N83-25118# California Univ., Livermore. Lawrence Livermore Lab.
UNDERSTANDING TANDEM MIRROR DEVICES
In its Energy and Technol. Rev. Nov. 1982 p 26-34 refs (For primary document see N83-25115 14-44)
Avail: NTIS HC A03/MF A01

Radial transport, Fokker-Planck calculations, and microstability are addressed. Author

N83-25119# Arizona Univ., Tucson. Dept. of Chemical Engineering.
POTENTIAL OF UTILIZATION OF GEOTHERMAL ENERGY IN ARIZONA Executive Summary Report
Don H. White and Larry A. Goldstone Aug. 1982 61 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004875; DOE/RA-50076/1) Avail: NTIS HC A04/MF A01

Arizona is one of the fastest growing states in the United States. It is in the midst of the movement of the population of the United States from its cold regions to the warm Southwest. Being a hot, arid region, its electrical demand is nearly 50% higher in the peak hot summer months than that of the other 7 months. The major uncertainty of utilizing geothermal energy in Arizona is that very little exploration and development have occurred to date. The potential for utilizing geothermal energy in Arizona is good based on the fat thatthere are over 3000 thermal wells in Arizona out of a total of about 30,000 shallow irrigation wells that were examined. There is much young volcanic rock in Arizona. The combination of data from thermal wells, young volcanic rock, water geochemistry and other geological tools, indicate that there is a large geothermal resource throughout the southern half of the state. It is suggested that most of this resource is in the range of 500 to 1500 C, limiting its uses to direct heat utilization rather than for electric power generation. DOE

N83-25120# Arizona Univ., Tucson. Dept of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: PIMA COUNTY
Don H. White and Larry A. Goldstone Aug. 1982 63 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004877; DOE/RA-50076/3) Avail: NTIS HC A04/MF A01

The Pima County Area Development evaluated the county-wide market potential for utilizing geothermal energy. Four potential geothermal resource areas with temperatures less than 1000 C (2120 F) were identified. In addition, one area is identified as having a temperature of 1470 F (2970 F). Geothermal resources are found to occur in Tecson where average population growth rates of two to three percent per year are expected over the next 40 years. Rapid growth in the manufacturing sector and the existence of major copper mines provide opportunities for the direct utilization of geothermal energy. However, available water suppiies are identified as a major constraing to projected growth. A regional energy analysis, future predictions for energy consumption, and energy prices are given. Potential geothermal users in Pima County are identified and projections of maximum economic geothermal utilization are given. One hundred fifteen firms in 32 industrial classes have some potential for geothermal use are identified. In addition, 26 agribusiness firms were found in the county. DOE

N83-25121# Decision Focus, Inc., Los Altos, Calif.
COMPRESSED-AIR ENERGY STORAGE: COMMERCIALIZATION POTENTIAL AND EPRI ROLES IN THE COMMERCIALIZATION PROCESS Final Report
D. W. Boyd, O. E. Buckley, and C. E. Clark Dec. 1982 150 p refs
(EPRI Proj. 1199-15)
(DE83-900987; EPRI-EM-2780) Avail: NTIS HC A07/MF A01

This report describes an assessment of potential roles that EPRI might take to facilitate the commercial acceptance of compressed air energy storage (CAES) systems. The assessment is based on (1) detailed analyses of the market potential of utility storage technologies, (2) interviews with representatives of key participants in the CAES market, and (3) a decision analysis synthesizing much of the information about market and technology status. The results indicate a large potential market for CAES systems if the overall business environment for utilities improves. In addition, it appears that EPRI can have a valuable incremental impact in ensuring that utilities realize the potential of CAES by (1) continuing an aggressive information dissemination and technology transfer program, (2) working to ensure the success of the first United States CAES installation at Soyland Power Cooperative, (3) developing planning methods to allow utilities to evaluate CAES and other storage options more effectively and more realistically, and (4) supporting R and D to resolve residual uncertainties in first-generation CAES cost and performance characteristics. DOE

N83-25122# RANN, Inc., Palo Alto, Calif.
SOME EXPLORATORY CONSIDERATIONS OF SCALE EFFECTS ON THE POTENTIAL PERFORMANCE OF WOOD ENERGY CONVERSION SYSTEMS
A. J. Eggers, Jr., Bruce A. Smith, and Larry W. Tombaugh 24 Jun. 1982 42 p refs
(Contract DE-AC03-80ET-20651)
(DE83-001378; DOE/ET-20651/T2) Avail: NTIS HC A03/MF A01

Scale effects on the potential performance of wood energy conversion systems whose products might compete in many of the same diverse and dispersed markets as comparable products from fossil fuels are explored. The analytical approach is derived from the average total cost formulation of micro-economics which is configured to account for the factors of total cost rate for wood production, transportation, and conversion in systems with a given conversion efficiency and capacity. The exploratory systems analysis includes: systems elements and cost formulation; area production and associated transportation; point production and associated transportation; conversion system capacity effects; conversion plant learning curve effects; subsystem disaggregation, staging, and production rate effects, and conversion plant financing effects. DOE

N83-25123# Stevens Point Area Co-op, Wis.
PASSIVE-SOLAR COLLECTOR: A TROMBE-WALL RETROFIT GUIDE
Tom Brown and Mark Dostal 1982 35 p refs
(Grants DE-FG02-80R5-10252; DE-FG02-81R5-10333)
(DE83-005189; DOE/R5-10333/3) Avail: NTIS HC A03/MF A01

Step by step instructions are given for converting existing south facing masonry walls into Trombe walls. Locally available materials are used for the most part and minimal carpentry skills are required. Some design variations and modifications are suggested. Performance monitoring and operation and maintenance are discussed. Costs are estimated. A way is given to estimate energy savings. DOE

N83-25124# Department of Energy, Washington, D. C.
REPORT TO THE CONGRESS: REGIONAL PETROLEUM RESERVES
31 Dec. 1982 68 p refs
(DE83-005270; DOE/EP-0080) Avail: NTIS HC A04/MF A01

Actions taken to determine the benefits and costs of establishing in-region Regional Petroleum Reserves (RPR's) and the extent to which existing analyses reflect DOE's current assessments of US and world supply/demand conditions are discussed. A discussion of sites considered, cost comparisons of RPR and Gulf Coast storage, an SPR distribution capabilities and is continuing system enhancements is given. The SPR Plan of 1977, in its thorough analysis of SPR options, developed a basic program oach which continues to be valid in today's petroleum market. Current assessments indicate that SPR system enhancements, current

market strategies, and the removal of prior regulatory barriers will significantly increase the flexibility of the SPR system in providing protection to all regions and noncontiguous areas. The SPR, located in the Gulf Coast salt domes as crude oil, continues to represent the most practical, efficient, and effective means of providing flexibility, security, and low cost energy storage. DOE

N83-25125# Illinois Inst. of Tech., Chicago. Dept. of Mechanical Engineering.
FEASIBILITY OF COGENERATED DISTRICT HEATING AND COOLING FOR NORTH LOOP PROJECT
Robert W. Porter Mar. 1982 30 p refs
(Contract DE-FG02-80CS-40337)
(DE83-005654; DOE/CS-40337/2; EMM-TM-82-2) Avail: NTIS HC A03/MF A01

A thermal-economic analysis was performed in order to determine feasibility of cogeneration with central heating and cooling for Chicago's North Loop Development Project. Heating, cooling and electrical loads were predicted by using energy data according to use and floor area, representative of downtown Chicago. The central facility proposed would supply cogenerated heating for a part of the development's demand and about one half of the cooling demand by means of combined conventional and cogeneration equipment together on the 4-pipe distribution system. Electricity would also be distributed and used to substantially displace purchases. Additional options are also discussed and, if economical, could make implementation more attractive. Four alternatives involving gas turbines and diesels were selected for study and are reported. Energy savings extend over the assumed 25 years of the project and are indexed to inflation and fuel-cost escalation. It would appear that cogeneration could assist economic development of the North Loop Project. DOE

N83-25126# Illinois Inst. of Tech., Chicago. Dept. of Mechanical Engineering.
FEASIBILITY CASE STUDY OF GAS-TURBINE DIRECT-HEAT INDUSTRIAL COGENERATION
K. Mastanaiah and R. W. Porter Mar. 1982 13 p refs
(Contract DE-FG02-80CS-40337)
(DE83-005655; DOE/CS-40377/1) Avail: NTIS HC A02/MF A01

A case study is presented here for the evaluation of economic feasibility of using gas-turbine cogeneration for a process industry requiring annual-average direct heat for certain dryers of about 32.210 (6)B/hr. The results of the economic analysis indicated that none of the alternatives considered are acceptably attractive, the best of them yielding only about 7% real return on investment (ROI) (15% effective ROI) after taxes, subject to the assumptions used. The low return on investment in this particular case is attributed to the relatively low cost of utility electric power at the margin for this particular company, and the fact that the size of the equipment required was too small in order to utilize more cost-effective turbines of a larger size. DOE

N83-25127# Stapenhorst (F. W. E.), Inc., Pointe Claire (Quebec).
GOODYEAR LAKE HYDROELECTRIC GENERATING STATION REDEVELOPMENT Final Report
Oct. 1982 34 p
(Contract DE-FC07-79RA-23211)
(DE83-004753; DOE/RA-23211/4) Avail: NTIS HC A03/MF A01

The Goodyear Lake low-head hydropower plant resulted from the rehabilitation of an old dam. The project construction costs, which included a 17% overrun from original cost estimates due chiefly to extraordinary rates of inflation are discussed. Operating costs and revenues are analyzed. DOE

N83-25128# Stilson (Alden E.) and Associates, Columbus, Ohio.
ROTATING FIELD COLLECTOR SUBSYSTEM PHASE 1 STUDY AND EVALUATION
Dedger Jones and James A. Eibling Oct. 1982 145 p refs
(Contracts DE-AC04-76DP-00789; SNLL-84-1986)
(DE83-003316; SAND-82-8184) Avail: NTIS HC A07/MF A01

The rotating field collector system is an alternative concept in which all heliostats are mounted on a single large platform which rotates around a tower to track the azumuthal angle of the Sun. Each heliostat is mounted to the platform with appropriate pivots, linkage, and controls to provide the additional positioning required to properly direct the solar radiation onto the receiver. The results are presented of the first phase of a study to investigate the technical and economic merits of a particular type of rotating field collector subsystem. The large pie-shaped platform would revolve over an array of support pedestals by means of a roller at the top of each pedestal. Several heliostats were built to demonstrate their construction features, and the operation of both flat and amphitheater rotating fields was studied. Work included an analysis of the concepts, development of modifications and additions to make the system comply with design criteria, and cost estimates to be used for comparison with other heliostat subsystems. Because of considerably high cost estimates, the focus of a large part of the study was directed toward developing lower cost designs of major components. DOE

N83-25129# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS PASSIVE TEST CELL RESULTS FOR THE 1981-82 WINTER
R. D. McFarland, J. C. Hedstrom, J. D. Balcomb, and S. W. Moore Oct. 1982 54 p refs
(Contract W-7405-eng-36)
(DE83-002948; LA-9543-MS) Avail: NTIS HC A04/MF A01

The Los Alamos test cell operation during the winter of 1981-82 including comparisons with the 1980-81 winter is discussed. Extensive data were taken and computer-analyzed to determine performance parameters such as efficiency, solar savings fraction, and discomfort index. The data from different test cells are directly comparable because each has similar heating-load coefficient and collector area. Configurations include direct gain, unvented Trombe walls, water wall, phase-change wall, and sunspaces. Strategies for reducing heat loss include selective surfaces, two types of improved glazing systems, a heat pipe system, and convection suppression fabbles. Significant difference in both auxiliary heat and comfort were observed among the various system types. The results are useful, not only for direct system comparisons, but also to provide data for validation of computer simulation programs. Availability of hourly data is described. DOE

N83-25130# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT FOR NEWMAN POWER STATION, EL PASO, TEXAS, VOLUME 14 Report, Jul. - Aug. 1982
Jan. 1983 40 p
(Contract DE-AC04-76DP-00789)
(DE83-005377; SAND-81-7086/14) Avail: NTIS HC A03/MF A01

Presented are the data accumulated during July and August at the intermediate photovoltaic project at Newman Power Station, El Paso, Texas. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-25131# Argonne National Lab., Ill.
ADVANCED-FUEL-CELL DEVELOPMENT Progress Report, Oct. - Dec. 1980
R. D. Pierce, R. M. Arons, J. T. Dusek, A. V. Fraioli, G. H. Kucera, J. W. Sim, and J. L. Smith Jun. 1982 38 p refs
(Contract W-31-109-eng-38)
(DE82-021146; ANL-81-67) Avail: NTIS HC A03/MF A01

The fuel cell research and development activities at Argonne National Laboratory (ANL) for the period October through December 1980. These efforts have been directed toward (1) developing alternative concepts for components of molten carbonate fuel cells, and (2) improving understanding of component behavior. The principal focus has been on development of gamma-LiAlO2 sinters as electrolyte structures. Green bodies were prepared by tape casting and then sintering beta-LiAlO2; this has produced gamma-LiAlO2 sinters of 69% porosity. In addition, a

cathode prepared by sintering lithiated nickel oxide was tested in a 10-cm square cell. DOE

N83-25132# California Univ., Berkeley. Lawrence Berkeley Lab. Energy and Environment Div.
APPLIED BATTERY AND ELECTROCHEMICAL RESEARCH PROGRAM
Frank McLarnon 1 Jun. 1982 158 p
(Contract DE-AC03-76SF-00098)
(DE82-020600; LBL-14304) Avail: NTIS HC A08/MF A01

Advanced electrochemical systems that satisfy stringent performance and economic requirements for electric vehicle and stationary energy storage applicatons are discussed. The most promising electrochemical technologies are identified and transferred to industry for further development and scale-up. General problem areas addressed by the program include identification of electrochemical couples for advanced batteries, determination of technical feasibility of couples, improvements in battery components, and establishment of engineering principles applicable to batteries and electrochemical processes. Major emphasis is given to applied research that will lead to superior performance and lower life cycle costs. DOE

N83-25133# Catalytic, Inc., Wilsonville, Ala.
OPERATION OF THE WILSONVILLE ADVANCED COAL-LIQUEFACTION R AND D FACILITY, WILSONVILLE, ALABAMA Quarterly Technical Progress Report, Jul. - Sep. 1981
Aug. 1982 188 p
(Contract DE-AC22-76ET-10154)
(DE83-000110; DOE/ET-10154/110) Avail: NTIS HC A09/MF A01

The operating conditions and test results which were obtained at the six ton per day advanced coal liquefaction R & D facility are summarized. The SRC unit operated for approximately 70% of the period with scheduled shutdowns accounting for more than 20% of the down time. Kentucky 9 coal was processed during all runs. Potential process improvements and tests were evaluated in the respective process units. Low severity reactor conditions for two stage liquefaction, and The V103 high pressure separator in the hot separator mode of operation at low severity reaction conditions were evaluated. The correlation between dissolver operating conditions and hydrogen leakage was investigated. DOE

N83-25134# Midwest Research Inst., Golden, Colo.
PREDICTING ENERGY SAVINGS ATTRIBUTED TO DAYLIGHTING
Claude L. Robbins Aug. 1982 11 p refs Presented at the Intern. Passive and Low-Energy Alternatives Conf., Bermuda, 5-15 Sep. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-022038; SERI/TP-254-1673; CONF-820928-3) Avail: NTIS HC A02/MF A01

A method is described for estimating a building's energy savings attributed to daylighting by predicting the percentage of the year that the electric lighting system is not in use. This depends on the particular control strategy chosen, a standard work year, and the amount of light (as a daylight factor) reaching on daylight and sunlight availability for selected cities in the United States. DOE

N83-25135# Midwest Research Inst., Golden, Colo. Daylighting Lab.
DAYLIGHT AND DAYLIGHTING LABORATORY AT THE SOLAR ENERGY RESEARCH INSTITUTUE
Claude L. Robbins and Kerri Hunter Aug. 1982 6 p refs Presented at the Intern. Passive and Low-Energy Alternatives Conf., Bermuda, 5-15 Sep. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-019255; SERI/TP-254-1652; CONF-820928-1) Avail: NTIS HC A02/MF A01

Daylighting theory is studied with respect to the particular daylight conditions in the United States. Experiments are performed on the integration of daylighting with other passive and conventional energy strategies for heating, cooling, and lighting buildings. DOE

N83-25136# Argonne National Lab., Ill. Chemical Engineering Div.
ADVANCED-FUEL-CELL DEVELOPMENT Progress Report, Apr. - Jun. 1981
R. D. Pierce, R. M. Arons, J. T. Dusek, A. V. Fraioli, G. H. Kucera, J. W. Sim, and J. L. Smith Aug. 1982 24 p refs
(Contract W-31-109-eng-38)
(DE82-021272; ANL-82-40) Avail: NTIS HC A02/MF A01

Fuel cell research and development activities are described. The efforts are directed toward: (1) understanding of component behavior in molten carbonate fuel cells, and (2) developing alternative concepts for components. The principal focus was on the development of sintered gamma LiAlO2 electrolyte supports, stable NiO cathodes, and hydrogen diffusion barriers. Cell tests were performed to assess diffusion barriers and to study cathode voltage relaxation following current interruption. DOE

N83-25137# Eagle-Picher Industries, Inc., Joplin, Mo.
RESEARCH, DEVELOPMENT, AND DEMONSTRATION OF NICKEL-IRON BATTERIES FOR ELECTRIC-VEHICLE PROPULSION Annual Report
E. P. Broglio Mar. 1982 42 p
(Contract W-31-109-eng-38)
(DE82-021266; ANL/OEPM-81-13) Avail: NTIS HC A03/MF A01

A nickel-iron battery system suitable for use in the propulsion of electric and electric/hybrid vehicles was developed. The development goals are: battery capacity of 25 to 30 kEh; specific energy (C/3 rate) of 60 Wh/kg; specific power of 100 W/Kg (peak) and 20 W/Kg (sustained); duty cycle of 2 to 4 hr for discharge and 4 to 8 hr for many; energy efficiency of $>$ 60%; cost of $70/kWh (1977); and cycle life (80% DOD) of 2000 cycles. The fabrication, characterization and testing of the required electrodes together with the assembly and testing of full-scale cells and 6 volt (270 Ah) modules was emphasized. DOE

N83-25138# Theisen (Phillip), Madison, Wis.
LOW-COST PROCESS-HEAT RECOVERY Final Report
Phillip Theisen and James McCray 26 May 1982 24 p refs Prepared in cooperation with McCray (James), Madison, Wisc.
(Contract DE-FG02-80R5-10251)
(DE82-016652; DOE/R5-10251/T1) Avail: NTIS HC A02/MF A01

Heat recovery systems developed specifically for use with gas-fired ovens such as those used in restaurants and bakeries are found to be a viable energy saying option for reducing operating expenses. The objectives of the work are: to assess waste heat recovery potential, perform and econokic analysis, design heat exchanger and system, develop an integrated computer program. The first three objectives were successfully met for flat plate and plate fin air to air heat reccovery systems. An interactive computer program is developed for heat recovery systems using the FORTRAN language, and an economic analysis program is developed. DOE

N83-25139# Sandia Labs., Albuquerque, N. Mex.
THERMOMECHANICAL CAVITY-GROWTH MODELING
R. E. Glass 1982 18 p refs Presented at the Conf. on Cryptosys., Santa Barbara, Calif., 23 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-020356; SAND-82-0956C; CONF-820852-1) Avail: NTIS HC A02/MF A01

The results of recent field tests, laboratory studies, and modeling efforts in UCG have indicated that the thermal and mechanical properties of coal may be the controlling parameters in determining initial cavity shape. In examining this possibility, laboratory efforts have been directed at determining temperature and bedding plan dependent properties of coal. A thermomechanical model which uses these properties has indicated that the cavity shapes seen at both the Hanna and Hoe Creek test sites result from the temperature dependent properties of the coal such as the coefficients of thermal expansion and the elastic moduli. The model determines stress levels and uses a simple bedding plane

dependent stress failure mechanism to determine cavity growth. DOE

N83-25140# Oak Ridge National Lab., Tenn. Metals and Ceramics Div.
ASSESSMENT OF MATERIALS AND COMPONENTS PERFORMANCE IN BI-Gas, WESTINGHOUSE AND COMBUSTION ENGINEERING GASIFICATION PILOT PLANTS
J. P. Hammond and J. R. Horton Aug. 1982 161 p refs
(Contract W-7405-eng-26)
(DE82-020457; ORNL/TM-8323) Avail: NTIS HC A08/MF A01

The performance of materials and components of three coal gasification pilot plants are assessed. The materials and components problems at the three pilot plants reviewed are generally no longer especially pressing from the viewpoint of successful operation in order to evaluate the individual gasification processes per se. However, for viable commercial processes to emerge, certain components must be developed, and the service lives and/or functionality of others must be improved. In some instances materials performance limitations prevent needed developments. The materials and components problems in the three plants are detailed and needed remedial actions are discussed. Recommendations on generic work required to fill gaps are presented. DOE

N83-25141# Westinghouse Electric Corp., Madison, Pa. Synthetic Fuels Div.
ADVANCED COAL-GASIFICATION SYSTEM FOR ELECTRIC-POWER GENERATION Final Report, 20 Mar. 1980 - 15 Jan. 1982
E. J. Chelen, G. B. Haldipur, W. J. Havener, D. L. Keairns, L. A. Salvador, and A. B. Turner 15 Jun. 1982 323 p refs
(Contract DE-AC21-80ET-14752)
(DE82-021338; DOE/ET-14752/28) Avail: NTIS HC A14/MF A01

The development of a pressurized, fluidized bed gasification process is discussed. The objective is to demonstrate the viability of the process for the production of low and intermediate-Btu fuel gas for electric power generation, synthetic natural gas, chemical feedstocks, and industrial fuels. The development and technology activities performed, as well as the PDU test results obtained, are reported. DOE

N83-25142# Sandia Labs., Albuquerque, N. Mex. Thermal Test and Analysis Div.
RESULTS OF SOLAR TESTING OF CIRCULAR FOIL HEAT-FLUX SENSORS AT THE WHITE SANDS SOLAR FURNACE
Bruce L. Bainbridge 1982 27 p Presented at the STTFUA High-Intensity Solar Flux Meas. Tech. Workshop, Albuquerque, N. Mex., 26 Oct. 1982
(Contract DE-AC04-76DP-00789)
(DE82-006282; SAND-81-2390C; CONF-821001-1) Avail: NTIS HC A03/MF A01

A pair of circular foil heat flux sensors were tested against a Kendall radiometer. The gages are a form of the circular foil type in that a mirrored elliposidal cavity is positioned in front of the foil surface. A small diameter aperture is used to reduce convective losses and the susceptibility of the gage to handling damage. An error analysis performed on the data acquired during the five day test program, indicates that atmospheric conditions and limitations of the facility preclude the accurate comparison of the heat flux sensors to the Kendall radiometer. Details about the data acquisition, error analysis, and consideration about the proper gage calibration procedure are included. DOE

N83-25143# Los Alamos Scientific Lab., N. Mex.
LOS ALAMOS NATIONAL LABORATORY SOLAR PROGRAM
S. K. Reisfeld and D. A. Neeper 1982 13 p refs Presented at the Passive and Hybrid Solar Energy Update Conf., Washington, 15-17 Sep. 1982
(Contract W-7405-eng-36)
(DE82-021760; LA-UR-82-2496; CONF-820940-2) Avail: NTIS HC A02/MF A01

Progress for passive solar tasks is reported. Results on test cell experiments for the 1981-1982 winter, class-A performance monitoring, passive cooling, both residential and commercial economic cooling assessments, and thermal effects of distributed mass in passive buildings are presented. E.A.K.

N83-25144# Midwest Research Inst., Golden, Colo.
ABLATIVE FAST PYROLYSIS OF BIOMASS IN THE ENTRAINED-FLOW CYCLONIC REACTOR AT SERI
James Diebold and John Scahill Jun. 1982 40 p refs Presented at the 14th Biomass Thermochem. Conversion Contractor's Meeting, Arlington, Va., 23-25 Jun. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-019768; SERI/TP-234-1654; CONF-820685-2) Avail: NTIS HC A03/MF A01

Progress with the entrained flow cyclonic reactor at SERI is detailed. Feedstocks successfully used include: wood flour and fairly large sawdust. It is shown that relatively complete vaporization of the biomass is realized and that the yields of tar or gas can be varied over quite a range with trends following first order kinetic concepts. DOE

N83-25145# Westinghouse Electric Corp., Pittsburgh, Pa. Advanced Energy Systems Div.
DEMONSTRATION OF NEW HIGH-PERFORMANCE BATTERIES IN COAL-MINING SCOOPS Final Technical Report
Richard Rosey Mar. 1982 139 p
(Contract DE-AC01-76ET-12581)
(DE82-020535; DOE/ET-12581/T1) Avail: NTIS HC A07/MF A01

The program objective was to demonstrate the performance features of an improved battery system in underground coal haulage applicatons that might increase productivity for the equipment and lower operating costs for the mine operator. The program initiated with an investigation of several mine facilities to evaluate the operation of battery powered coal haulers. A design concept and specification for the nickel-iron battery was developed for use in a S and S Corporation CX-2 UNATRAC Coal Hauler. An 800 Ah, 132 VDC nickel-iron battery system was assembled and tested. Field tests were conducted at an aboveground test track to simulate actual mining environments. Test results indicated that the nickel-iron battery could provide a range of 40 to 70% additional trips per battery charge cycle. Auxiliary hardware functioned as designed and demonstrated the automatic battery maintenance features. A relatively high number of cell package failures occurred during this test period that precluded an underground demonstration. DOE

N83-25146# BDM Corp., Albuquerque, N. Mex.
GEOTHERMAL COMPLETION TECHNOLOGY LIFE-CYCLE COST MODEL (GEOCOM)
A. J. Mansure and C. C. Carson 1982 4 p refs Presented at the Ann. Geothermal Resources Council Meeting, San Diego, Calif., 11 Oct. 1982 Prepared in cooperation with Sandia National Labs.
(Contract DE-AC04-77DP-00789)
(DE82-016787; SAND-82-1435C; CONF-821007-2) Avail: NTIS HC A02/MF A01

The GEOCOM is a model which evaluates the cost effectiveness of alternative technologies used in the completion, production, and maintenance of geothermal wells was developed. The model calculates the ratio of life cycle cost to life cycle production or injection and thus is appropriate for evaluating the cost effectiveness of a geothermal well even when the most economically profitable well completion strategies do not result in lowest capital costs. The project to develop the GEOCOM model included the establishment of a data base for studying geothermal completions and preliminary case/sensitivity studies. The code has the data base built into its structure as a default parameters. These parameters include geothermal resource characteristics; costs of geothermal wells, workovers, and equipment; and other data. The GEOCOM model is written in American National Standard Institute (ANSI) FORTRAN 1966 version. DOE

N83-25147# Los Alamos Scientific Lab., N. Mex.
DEVELOPMENT OF HIGH-TEMPERATURE LIQUID-METAL HEAT PIPES FOR ISOTHERMAL IRRADIATION ASSEMBLIES
E. S. Keddy and H. E. Martinez 1982 6 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf.; Los Angeles, 8-13 Aug. 1982
(Contract W-7405-eng-36)
(DE82-016073; LA-UR-82-1273; CONF-820814-8) Avail: NTIS HC A02/MF A01

This paper describes the development of high-temperature heat pipes and their operating performance using liquid metal working fluids to provide high heat transfer assemblies for in-pile testing of UO2 fuel. The fuel assembly consists of thin UO2 wafers sandwiched between molybdenum discs, and is one of the components of the space nuclear reactor electrical power plant currently under development. The intended operation of the heat pipes is to control the temperature of the UO2 irradiation experiment in the Experimental Breeder Reactor (EBR-II). This application involves vertical operation in a gravity-assist mode, with the evaporator end down. Heat pipe construction and preparation techniques are described. Laboratory tests were made and the performance characteristics determined. Test results are compared with calculated heat transfer limit. DOE

N83-25148# Washington State Energy Office, Olympia.
DEVELOPING HYDROPOWER IN WASHINGTON STATE. VOLUME 2: AN ELECTRICITY MARKETING MANUAL
Jeffrey W. James and Gilbert A. McCoy Mar. 1982 180 p refs
(Contract DE-FG06-80RO-01001)
(DE82-017778; WAOENG-81-02-2) Avail: NTIS HC A09/MF A01

An electricity marketing manual for the potential small and micro-hydroelectric project developer within the state of Washington is presented. Public utility regulatory policies (PURPA) requires electric utilities to interconnect with and pay a rate based on their full avoided costs for the purchase of electrical output from qualifying small power production facilities. The determination of avoided costs, as business organizational considerations, utility interface concerns, interconnection requirements, metering options, and liability and wheeling are discussed. The utility responses are summarized, legislation which is of importance to hydropower developers and the powers and functions of the authorities responsible for enforcing the mandate of PURPA are described. DOE

N83-25149# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
LOW-TO-MODERATE-TEMPERATURE HYDROTHERMAL RESERVOIR ENGINEERING HANDBOOK
Jun. 1982 111 p refs Prepared in cooperation with California Univ., Lawrence Berkeley Lab.
(Contract DE-AC07-76ID-01570)
(DE82-016282; IDO-10099-Vol-2) Avail: NTIS HC A06/MF A01

Units and conversions, glossary of terms, instrumentation, fabrication of instruments are presented. The VARFLOW program user's guide, and reference bibliography are also included. DOE

N83-25150# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
WIND-ENERGY PROGRAM Quarterly Review.
Richard Mitchell, Robert J. Noun, Theresa Flaim, Martin Deutsch, Eric Jacobs, Susan Hock, Howard Sklar, and N. D. Kelley May 1982 40 p
(Contract DE-AC02-77CH-00178)
(DE82-014199; SERI/PR-211-1589; QR-2) Avail: NTIS HC A03/MF A01

Progress on the wind energy tasks is summarized: program management and planning; WECS applications in nongenerating utilities; technical feasibility of stand-alone SWECS; WECS/storage assessment and options; WECS performance/value analysis; wind energy industry analysis; wind systems coordination; wind workshops; noise and television interference studies; and advanced and innovative wind energy concepts. DOE

N83-25151# Aerospace Systems, Inc., Burlington, Mass.
ASI/PINSON 1-KILOWATT HIGH-RELIABILITY WIND-SYSTEM DEVELOPMENT. PHASE 1: DESIGN AND ANALYSIS Executive Summary Report
R. B. Noll, N. D. Ham, H. M. Drees, and L. B. Nichols Mar. 1982 27 p Prepared in cooperation with Pinson Energy Corp., Marstons Mills, Mass.; Natural Power, Inc., New Boston, N.H. Prepared for Rockwell International Corp., Golden, Colo.
(Contract DE-AC04-76DP-03533)
(DE82-015600; RFP-3046-1) Avail: NTIS HC A03/MF A01

A high reliability version of a unique vertical axis machine called the Cycloturbine is a 15-ft diameter turbine with three straight 8 ft blades controlled by a tilt cam mechanism. The tilt cam mechanism controls blade cyclic pitch amplitudes in a manner similar to a helicopter swash plate. The electronic circuitry, consists of a voltage regulator and a power rectifier. Two transient protection networks are included, one on the tower for the alternator and the other to protect circuitry in the control building. The unique configuration of the Cycloturbine necessitated the development of aerodynamic, performance, and structural analyses to evaluate the design. A commercial Cycloturbine was instrumented and tested to verify the aerodynamic, performance and structural analyses. Author

N83-25152# Little (Arthur D.), Inc., Cambridge, Mass.
WIND-TURBINE-PERFORMANCE ASSESSMENT Interim Report
W. A. Vachon Jun. 1982 131 p refs Sponsored by EPRI
(EPRI Proj. 1996-1)
(DE82-905281; EPRI-AP-2456; TSR-4) Avail: NTIS HC A07/MF A01

An updated summary of recent test data and experiences is reported from both federally and privately funded large wind turbine (WT) development and test programs, and from key WT programs in Europe. Progress and experiences on both the cluster of three MOD-2 2.5-MW WT's, the MOD-1 2-MW WT, and other WT installations are described. An examination of recent test experiences and plans from approximately five privately funded large WT programs in the United States indicates that, during machine checkout and startup, technical problems are identified, which require and startup, a number of technical problems are identified, which will require design changes and create program delays. Author

N83-25153# Battelle Human Affairs Research Centers, Seattle, Wash.
US DEPARTMENT OF ENERGY WIND TURBINE CANDIDATE SITE PROGRAM: THE REGULATORY PROCESS
Marjorie R. Greene and Kim R. York Jun. 1982 94 p refs Prepared in cooperation with Pacific Northwest Lab., Richland, Wash.
(Contract DE-AC06-76RL-01830)
(DE82-018444; PNL-4066) Avail: NTIS HC A05/MF A01

Sites selected in 1979 as tentative sites for installation of a demonstration MOD-2 turbine are emphasized. Selection as a candidate site in this program meant that the US Department of Energy (DOE) designated the site as eligible for a DOE-purchased and installed meteorological tower. The regulatory procedures which involved in the siting and installation of meteorological towers at the majority of the candidate sites are examined. The legal and regulatory procedures required to put up a turbine at each of these candidate sites are identified. The major findings are summarized on the following: federal requirements, state requirements, local requirements, land ownership, wind rights, and public attitudes. DOE

N83-25154# Enertech Engineering and Research Co., Houston, Tex.
ADVANCED WELLBORE THERMAL SIMULATOR GEOTEMP2 RESEARCH REPORT
Robert F. Mitchell Feb. 1982 84 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020050; SAND-82-7003/1) Avail: NTIS HC A05/MF A01

The development of the GEOTEMP2 wellbore thermal simulator is described. The major technical features include a general purpose air and mist drilling simulator and a two-phase steam flow simulator that can model either injection or production. DOE

N83-25155# Los Alamos Scientific Lab., N. Mex. Earth and Space Sciences Div.
POTENTIAL FOR HOT-DRY-ROCK GEOTHERMAL RESOURCES: EXPERIMENTAL RESULTS
John C. Rowley, Grant Heiken, Hugh D. Murphy, and M. Kuriyagawa (National Research Inst. for Pollution and Resources, Yatabe, Ibaraki, Japan) 1982 18 p refs Presented at the 3rd AAPG Circum-Pacific Energy and Mater. Conf., Honolulu, 22-28 Aug. 1982
(Contract W-7405-eng-36)
(DE82-019534; LA-UR-82-2269; CONF-820834-1) Avail: NTIS HC A02/MF A01

Hot dry rock (HDR) contains insufficient permeability and fluid for natural hydrothermal development, but water pumped in a circulation loop through a HDR reservoir (hydraulically fractured between two drill holes) is being tested and evaluated. The formation of such in situ heat transfer systems, and subsequent testing of the man-made geothermal reservoirs in the Jemez volcanic field, New Mexico have already indicated the technical feasibility of the hot dry rock (HDR) geothermal concept. Documented production history and heat-extraction data obtained during the period from 1978 to 1980 have confirmed heat transfer, low water loss, and predictable thermal drawdown models for the HDR systems. During a nine month test of closed-loop heat extraction operations, 15 x 10 to the 6th power kWh of thermal energy were produced. The effective heat-transfer area and volume of the reservoir increased due to secondary fracturing caused by thermal contraction of the reservoir rock, and sustained pressurization. Drilling, fracturing, and testing of a larger, hotter reservoir system is now underway on a HDR geothermal reservoir of commercial size. DOE

N83-25156# Oak Ridge National Lab., Tenn. Engineering Technology Div.
EARTH THERMAL STORAGE FOR ENHANCED PERFORMANCE OF AIR-TO-AIR HEAT PUMPS
M. P. Ternes 1982 13 p Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles, 8-13 Aug. 1982
(Contract W-7405-eng-26)
(DE83-020773; CONF-820814-28) Avail: NTIS HC A02/MF A01

The heat that exists naturally in the earth under a house with a crawl space is used in the winter months to preheat the source air of an air to air heat pump and, thereby, bring about improvements in the efficiency of the heat pump. The source air is warmed by drawing it through the crawl space where it gains heat from the warmer earth. This allows the heat pump to operate in a climate more favorable than ambient. In the past winter, a comprehensive, comparative test of the concept was begun. This test involves three identical unoccupied houses in the Knoxville area, two of which were configured to use the crawl space but in a different manner for each. The third house has a standard heat pump installation and serves as the control for the experiment. The houses were highly instrumented in order to determine the net benefit of the concept. Results from the experiment for the past winter showed that dramatic improvements in the heat pump performance. DOE

N83-25157# Oak Ridge National Lab., Tenn. Engineering Technology Div.
EARTH THERMAL-STORAGE-ASSISTED HEAT PUMP
Mark P. Ternes 1982 7 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va., 23 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020823; CONF-820827-6) Avail: NTIS HC A02/MF A01

The earth under a house with crawl space may be used to thermally condition the source air of air-to-air heat pump during the winter as well as the summer. This allows the heat pump to operate in a temperature climate more favorable than ambient and, thus, at a higher efficiency. During this reporting period, a comprehensive, comparative test involving three unoccupied houses was begun to determine the net benefit of this concept. Results from the experiment for the past winter showed that dramatic improvements in the heat pump performance were obtained during midwinter conditions. Definitive conclusion cannot be made, however, because of the anomalies which were encountered. Summer data collection is currently underway, and no results are available at this time. DOE

N83-25158# Oak Ridge National Lab., Tenn. Engineering Technology Div.
HEAT-PUMP COOL STORAGE IN A CLATHRATE OF FREON
J. J. Tomlinson 1982 7 p refs Presented at the Energy Storage Contractors Rev. Meeting, Arlington, Va., 23 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020840; CONF-820827-13) Avail: NTIS HC A02/MF A01

Presented are the analytical description and assessment of a unique heat pump/storage system in which the conventional evaporator of the vapor compression cycle is replaced by a highly efficient direct contract crystallizer. The thermal storage technique requires the formation of a refrigerant gas hydrate (a clathrate) and exploits an enthalpy of reaction comparable to the heat of fusion of ice. Additional system operational benefits include cool storage at the favorable temperatures of 4 to 7 C (40 to 45 F), and highly efficient heat transfer ates afforded by he direct contact mechanism. In addition, the experimental approach underway at ORNL to study such a system is discussed. DOE

N83-25159# Tennessee Univ., Knoxville. Center for Energy, Environment and Resources.
EVALUATION OF STRATIFIED THERMAL-STORAGE SYSTEM FOR OLIVER SPRINGS ELEMENTARY SCHOOL
R. L. Reid and A. F. G. Bedinger 1982 10 p refs Presented at the Energy Storage Contractors Rev. Meeting, Arlington, Va., 23-25 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020839; CONF-820827-14) Avail: NTIS HC A02/MF A01

The thermal storage system at the Oliver Springs Elementary School consists of three cast-in-place concrete water storage tanks, each approximately 2956 ft(3) and using a flexible membrane device to resist temperature blending. The membrane can float up and down to suit variable conditions. The design goals of the heat recovery and thermal energy storage are to minimize the need to purchase energy for space heating, cooling, and water heating and to minimize electrical demand. The system is described and the history of the project is briefly reviewed. The automatic data acquisition system and the data analysis are also briefly discussed. DOE

N83-25160# Oak Ridge Y-12 Plant, Tenn.
FLYWHEEL TESTING AND EVALUATION
R. S. Steele 1982 11 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va., 23-26 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020894; CONF-820827-7) Avail: NTIS HC A02/MF A01

The state of the art in composite flywheels technology and the supporting data are discussed. Composite flywheel performance is superior to that of metallic flywheels, while presenting less severe containment requirements. Composite flywheel fatigue life exceeds 1000 cycles. Thermal considerations dictate a low pressure environment. Balance characteristics of composite flywheels require special suspension provisions. Analytical models predict performance with increasing confidence and are thus becoming more useful in establishing reliability of the rotor. DOE

N83-25161# Union Carbide Corp., Oak Ridge, Tenn. Nuclear Div.
FLYWHEEL EVALUATION AT ORFEL ROTOR TESTING IN FY 1982
E. F. Babelay, Jr. 1982 10 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va., 23-26 Aug. 1982

(Contract W-7405-eng-26)
(DE82-020825; CONF-820827-8) Avail: NTIS HC A02/MF A01

The results and observations of flywheel spin tests are summarized. Test results include the completed cyclic fatigue test. Ultimate speed evaluations for a modified rotor and three low cost flywheels are also reported. DOE

N83-25162# Oak Ridge National Lab., Tenn. Chemistry Div.
BASIC CHEMICAL STUDIES RELATED TO LOW-TEMPERATURE THERMAL-ENERGY STORAGE. TASK 1: THERMO-DYNAMIC PROPERTIES AND INTERACTIONS OF SALT HYDRATES USED AS PHASE-CHANGE MATERIALS
J. Braunstein 1982 7 p refs Presented at the Energy Storage Contractors Review Meeting, Arlington, Va., 23-26 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020826; CONF-820827-9) Avail: NTIS HC A02/MF A01

The state of the art of salt hydrates as phase change materials is reviewed. Phase equilibria, nucleation and melting kinetics of the commonly used hydrates (e.g., Na2SO4 10H2O, Na2S2O3 5H2O, CaCl2 6H2O, MgCl2 6H2O are included with the objective of identifying research that will result in more practicable use of these materials. A survey of the literature was made and a list of recommended basic chemical research was prepared. DOE

N83-25163# New Mexico Univ., Albuquerque. Dept. of Mechanical Engineering.
PERFORMANCE OF LABYRINTH-STRATIFIED WATER-STORAGE SYSTEM FOR HEATING AND COOLING
Maurice W. Wildin 1982 16 p refs Presented at the US DOE Phys. and Chem. Storage Branch Contractors Rev. Meeting, Arlington, Va., 23-26 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020817; CONF-820827-16) Avail: NTIS HC A02/MF A01

The feasibility of storing heating or cooling capacity in thermally stratified water contained in rectangular concrete tanks was demonstrated. For the approximately cubical tanks, which were 4.6 meters deep, and for the flow rates which were employed in a diurnal charge-discharge cycle, thermoclines about three feet thick were routinely established during charging and discharging phases of an operating cycle. Linear diffusers were designed to introduce water into the tanks and remove it at low velocity and with a relatively uniform distribution. Thermal efficiency was evaluated. The efficiency realized from cooled storage was in the range from 80 to 90%, while that for heated storage was in the range from 65 to 81%. The higher efficiency of cooled storage is due to several factors, including lower temperature difference to produce energy flow across the boundaries, less internal mixing in storage when the partitions were present and shorter average residence times of energy in storage. DOE

N83-25164# Oak Ridge National Lab., Tenn. Engineering Technology Div.
OAK RIDGE NATIONAL LABORATORY THERMAL-ENERGY-STORAGE PROGRAM OVERVIEW
James F. Martin 1982 11 p Presented at the Energy Storage Contractors Rev. Meeting, Arlington, Va., 23 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020818; CONF-820827-17) Avail: NTIS HC A02/MF A01

Thermal energy storage technology development for building heating and cooling and industrial applications was reviewed. The program of technical assessment and research and development is carried out in support of the national objective of energy conservation and development of new energy sources. The activities supported by this program are described. DOE

N83-25165# Oak Ridge National Lab., Tenn. Energy Div.
A COMPARISON OF LABORATORY AND FIELD-TEST MEASUREMENTS OF HEAT-PUMP WATER HEATERS
W. P. Levins 1982 22 p refs Presented at the ACEEE 1982 Summer Study in Energy Efficient Buildings, Santa Cruz, Calif. 21-28 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020810; CONF-820849-2) Avail: NTIS HC A02/MF A01

After developing the heat pump water heater (HPWH), a field-test plan was implemented whereby 20 US utilities each received five units for a year test period. During the field tests, two of the prototype HPWHs identical to the field test units were tested in the laboratory. A comparison of the laboratory and the field test data was excellent on an overall basis but showed differences for parametric temperature sensitivites. Field test data for the effect of the HPWH on the house heating system were not only overly conclusive, but laboratory test data were used to analytically evaluate this effect. DOE

N83-25166# Westinghouse Electric Corp., West Lafayette, Ind.
COMPRESSED-AIR ENERGY-STORAGE PRELIMINARY DESIGN AND SITE DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 8: AQUIFER FLOW CODE SIMULATION Final Report
D. L. Ayers Dec. 1982 307 p refs Sponsored in part by Electric Power Research Inst. Prepared in cooperation with Public Service Co. of Indiana, Inc., Plainfield
(DE83-005730; EPRI-EM-2351-Vol-8) Avail: NTIS HC A14/MF A01

The behavior and suitability of an aquifer based compressed air energy storage (CAES) plant was investigated. Methodologies and preliminary design procedures for developing, designing, constructing, and operating a CAES facility utilizing an aquifer storage formation were assessed. Development and results from a one dimensional air flow/pressure loss model are described. These models are analytic tools utilized to predict aquifer performance and CAES system analysis. GRA

N83-25167# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 6: FOR OKLAHOMA CENTER FOR SCIENCE AND ARTS, OKLAHOMA CITY, OKLAHOMA, OCTOBER 1982
Dec. 1982 26 p
(Contract DE-AC04-76DP-00789)
(DE83-005489; SAND-81-7087/6) Avail: NTIS HC A03/MF A01

Presented are the data accumulated during October 1982 at the intermediate photovoltaic project at Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-25168# Sandia Labs., Albuquerque, N. Mex. Solar Energy Dept.
SHENANDOAH SOLAR TOTAL-ENERGY PROJECT
James A. Leonard and Robert W. Hunke Dec. 1982 10 p
(Contract DE-AC04-76DP-00789)
(DE83-005244; SAND-80-2560) Avail: NTIS HC A02/MF A01

The design and construction of the world's first solar total energy plant in the private sector was completed and checkout is underway. During its operational phase, the solar plant will furnish electrical power, process steam, and other thermal energy to a nearby knitwear factory. The solar system consists of a collector field containing 114 parabolic dish collectors which supply thermal energy at 4000 C to drive a 400 kW multistage Rankine cycle turbine generator. Some steam is extracted from the turbine and supplied to the knitwear manufacturing processes. The system will be grid connected. Presented are a description of the system and components being installed; a summary of performance testing of the extraction turbine and of four prototype parabolic dish collectors; and a discussion of design considerations and insights which have general applicability to solar thermal system designs. DOE

N83-25169# Lincoln Lab., Mass. Inst. of Tech., Lexington.
POWER PROCESSING SUBSYSTEMS FOR THE 100-kWp SOLAR-PHOTOVOLTAIC-POWER SYSTEM AT THE NATURAL BRIDGES NATIONAL MONUMENT IN UTAH
F. J. Solman and S. D. Coleman 30 Jun. 1982 201 p
(Contract DE-AC02-76ET-20279)

(DE83-005246; DOE/ET-20279/180-Vol-5) Avail: NTIS HC A10/MF A01

The power processing subsystem for the Natural Bridges National Monument photovoltaic power system including inverters, battery chargers, battery, diesel generator, site transfer switch, transformer in-rush controller, furnace loads, and load control equipment are described. Components and subsystem testing are also discussed. Also included are the solution to operational problems. DOE

N83-25170# Stevens Point Area Co-op, Wis.
COOPERATIVE PASSIVE-SOLAR COMMERCIAL RETROFIT Final Report, 1 Sep. 1980 - 31 Dec. 1982
W. Thomas Brown Dec. 1982 14 p
(Grant DE-FG02-80R5-10252)
(DE83-005269; DOE/R5-10252/2) Avail: NTIS HC A02/MF A01

The primary objectives of this project were: the conversion of an existing south-facing storefront into a trombe'-wall passive solar collector, the sharing of information on simple low-cost energy alternatives with the local community, and the reduction of the store building's dependence on non-renewable fossil fuel for space heating. Six 6' wide pre-assembled collector glazing panels were mounted on a 12' high by 36' long portion of the south-facing masonry wall. Vent-holes were cut through the wall at each panel to provide air inlets and outlets for the collector and monitoring equipment was installed to record performance. A series of hands-on construction workshops were attended by Co-op and community members. During these sessions, collector components were assembled. The panels were installed on April 22, 1981 in celebration of Earth Day. Additional sessions were held to complete the project, make necessary modifications and install sensors. Project personnel participated in several energy-education activities, including workshops, seminars and alternative energy home tours. A community-based energy resource council was founded with the assistance of several key Co-op project members and a fully-illustrated How-To manual, entitled Passive Solar Collector: A Trombe'-Wall Retrofit Guide was published. Finally, a variety of energy conservation measures were undertaken. These included a new airlock store entry, insulated store ceiling, destratification ceiling fans and wood-burning furnaces have combined with the passive solar collector to substantially reduce the use of fuel oil for heat. DOE

N83-25171# Sandia Labs., Albuquerque, N. Mex. Solar Research and Evaluation Div.
DEVELOPMENT OF A SOLAR-FLUX TRACKER FOR PARABOLIC-TROUGH COLLECTORS
Karlan D. Boultinghouse Sep. 1982 33 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005361; SAND-82-1600) Avail: NTIS HC A03/MF A01

The development of a solar flux tracker for application to a parabolic trough solar thermal collector is described. Tests were conducted at the Collector Module Test Facility and Performance Prototype Trough Test Facility on a resistance wire type solar flux sensor. The device consists of two fine wires installed along each side of the absorber tube parallel to the axis. The wires change resistance as a function of the solar flux arriving at the absorber from the reflectors. The resistance of the two wires is compared to produce a null signal when both wires are equally illuminated. The signal from the wires is used in combination with a microprocessor control system to drive the collectors to the optimum tracking angle. Comparisons are made between the performance of the flux tracker, a computer based tracker, and a shadow band tracker. DOE

N83-25172# General Electric Co., Philadelphia, Pa. Energy Systems and Technology Div.
INITIAL DETAILED DESIGNS FOR INTERMEDIATE PHOTOVOLTAIC SYSTEMS: OFFICE BUILDING
J. Herz and G. OBrien Jul. 1982 198 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005365; SAND-81-7188) Avail: NTIS HC A09/MF A01

A detailed design is presented for a 140 kW ground mounted flat plate array photovoltaic system to serve a three story office building. The design is analyzed for performance and economics. Building architectural features and load demands are defined. Photovoltaic array, electrical system design, and system installation are discussed, along with alternative design choices. Specifications and installation details are included. DOE

N83-25173# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 3. FOR OKLAHOMA CENTER FOR SCIENCE AND ARTS, OKLAHOMA CITY, OKLAHOMA
Oct. 1982 45 p
(Contract DE-AC04-76DP-00789)
(DE83-005379; SAND-81-7087/3) Avail: NTIS HC A03/MF A01

Presented are the data accumulated during May at the intermediate photovoltaic project at Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-25174# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 4. FOR G. N. WILCOX MEMORIAL HOSPITAL, KAUAI, HAWAII FOR JUNE, JULY, AND AUGUST 1982
Thomas D. Harrison (Sandia National Lab.) Dec. 1982 74 p
(Contract DE-AC04-76DP-00789)
(DE83-005380; SAND-81-7080/4) Avail: NTIS HC A04/MF A01

Presented are the data accumulated during June, July, and August 1982 at the intermediate photovoltaic project at G.N. Wilcox Memorial Hospital, Kauai, Hawaii. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities not attributable to weather are provided. DOE

N83-25175# Arizona Univ., Tucson. Dept. of Chemical Engineering.
MARYVALE TERRACE: GEOTHERMAL RESIDENTIAL DISTRICT SPACE HEATING AND COOLING
Don H. White and Larry A. Goldstone Aug. 1982 38 p refs
(Contract DE-FC03-80RA-50076)
(DE83-005288; DOE/RA-50076/15) Avail: NTIS HC A03/MF A01

A preliminary study of the technical and economic feasibility of installing a geothermal district heating and cooling system is analyzed for the Maryvale Terrace residential subdevelopment in Phoenix, Arizona, consisting of 557 residential houses. The design heating load was estimated to be 16.77 million Btu/h and the design cooling load was estimated to be 14.65 million Btu/h. Average annual energy use for the development was estimated to be 5870 million Btu/y and 14,650 million Btu/y for heating and cooling, respectively. Competing fuels are natural gas for heating and electricity for cooling. A geothermal resource is assumed to exist beneath the site at a depth of 6000 feet. Five production wells producing 1000 qpm each of 2200 F geothermal fluid are required. Total estimated cost for installing the system is $5,079, 300. First year system operations cost (including debt service) is $974,361. The average annual geothermal heating and cooling cost per home is estimated to be $1750 as compared to a conventional system annual cost of $1145. DOE

N83-25176# Edgerton, Germeshausen and Grier, Inc., Albuquerque, N. Mex. Energy Measurements Group.
PERFORMANCE TESTING OF THE SOLAR KINETICS T-700A SOLAR COLLECTOR
Vernon E. Dudley and Robert M. Workhoven (Sandia National Lab.) Nov. 1982 85 p refs
(Contract DE-AC04-76DP-00789)
(DE83-005382; SAND-81-0984) Avail: NTIS HC A05/MF A01

Results are summarized of tests conducted on a Solar Kinetics T-700A solar collector which is a parabolic trough collector. The collector was evaluated with a glass mirror and with an acrylic film-reflector surface. Tests were conducted over a temperature

range from 200 to 3600 C, using three heat-transfer fluids and absorber tubes of two different diameters. Tests were also made with direct normal solar irradiance from 200 to 1050 W/m(2). Collector efficiency and thermal loss were found to change significantly with changes in solar irradiance. Using only a measured efficiency curve, a thermal loss curve, and a measurement of the approximate optical efficiency, a procedure was developed to predict the collector efficiency and thermal loss at any level of solar irradiance and for any temperature within the range of test data. DOE

N83-25177# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL HEATING FOR THE ARIZONA ENVIRONMENTAL RESEARCH LABORATORY GREENHOUSES
Don H. White and Larry A. Goldstone Aug. 1982 33 p refs
(Contract DE-FC03-80RA-50076)
(DE83-005287; DOE/RA-50076/14) Avail: NTIS HC A03/MF A01

The technical and economic feasibility of installing a retrofit geothermal heating system is analyzed for a greenhouse facility. The facility consists of 10.6 acres of greenhouse area, of which 7.4 acres are currently operational. Natural gas or diesel fuel are presently used for heating. The maximum heating Load is estimated to be 28,620,000 Btu/hr. Average annual heating energy consumption was 35,684 million Btu/year for 7.4 acres of greenhouse. The 2500 foot geothermal production wells are required, each capable of producing 1500 gpm of 1300F water. The geothermal water is expected to contain 500 ppM total dissolved solids. The expected first year geothermal energy cost savings are estimated. A simple payback of 9.1 years is calculated. The project as herein presented is marginally economic. However it is clear that an attractive economic case can be made for providing about 50 to 60 percent of the required heating load as a base load using geothermal energy. DOE

N83-25178# Midwest Research Inst., Golden, Colo. Renewable Resource Assessment and Instrumentation Branch.
CATALOG OF AUTOMATIC SUN-FOLLOWING TRACKERS
Thomas L. Stoffel Nov. 1982 127 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-005529; SERI/TR-215-1490) Avail: NTIS HC A07/MF A01

Instrument platforms required for monitoring the solar radiation resources, controlling the alignment of solar collectors, and a variety of research applications where accurate and continuous alignment with the Sun is important are investigated. The development status and availability of automatic Sun-following trackers are assessed. DOE

N83-25179# Pennsylvania State Univ., University Park. Coal Research Section.
THE CHARACTERISTICS OF AMERICAN COALS IN RELATION TO THEIR CONVERSION INTO CLEAN-ENERGY FUELS Final Report
W. Spackman, A. Davis, P. L. Walker, H. L. Lovell, F. J. Vastola, P. H. Given, N. H. Suhr, and R. G. Jenkins Jun. 1982 203 p
(Contract DE-AC01-76ET-10615)
(DE82-017041; DOE/ET-10615/17; FE-2030-17) Avail: NTIS HC A10/MF A01

The Sample Bank for characterization of coal includes full seam channel samples as well as samples of lithotypes, seam benches, and subseam sections. The data include: proximate analysis, ultimate analysis, sulfur froms analysis, calorific value, maceral analysis, vitrinite reflectance analysis, ash fusion analysis, free-swelling index determination, Gray-King coke type determination, Hardgrove grindability determination, Vicker's microhardness determination, major and minor element analysis, trace element analysis, and mineral species analysis. The pyrolysis of coal was studied the reactivity of chars, produced from all ranks of American coals, was studied for reactivity to air, CO2, H2 and steam. The catalytic effect of minerals and various cations on the gasification processes was examined. Combustion of chars, low volatile fuels, coal-oil-water-air emulsions and other subjects of research are reported. DOE

N83-25180# Pennsylvania State Univ., University Park. Coal Research Section.
THE CHARACTERISTICS OF AMERICAN COALS IN RELATION TO THEIR CONVERSION INTO CLEAN-ENERGY FUELS Final Report
W. Spackman Jun. 1982 502 p
(Contract DE-AC01-76ET-10615)
(DE82-017040; DOE/ET-10615/17-App-8A; FE-2030-17-App-8A)
Avail: NTIS HC A22/MF A01

Coals are classified in relation to their conversion into clean energy fuels. Representative compositional data is given from full seam samples. Data is presented in tabular form. S.L.

N83-25181# Pennsylvania Transportation Inst., University Park.
THE CHARACTERISTICS OF AMERICAN COALS IN RELATION TO THEIR CONVERSION INTO CLEAN-ENERGY FUELS, APPENDIX 8 B Final Report
W. Spackman Jun. 1982 578 p
(Contract DE-AC01-76ET-10615)
(DE82-017047; DOE/ET-10615/17-App-8B; FE-2030-17-App-8B)
Avail: NTIS HC A25/MF A01

The characteristics of American coals as related to its conversion into clean energy fuels were analyzed. Data bases and numerical tables are presented. DOE

N83-25182# Lockheed Missiles and Space Co., Palo Alto, Calif. Metallurgy and Composites Lab.
MATERIALS PROBLEMS IN FLUIDIZED-BED-COMBUSTION AND COAL-GASIFICATION SYSTEMS: FURTHER STUDIES OF CORROSION CHEMISTRY IN LOW-OXYGEN ACTIVITY ATMOSPHERES Final Report
R. A. Perkins, W. C. Coons, and S. J. Vonk Jun. 1982 190 p refs Sponsored by EPRI
(EPRI Proj. 979-6)
(DE82-905772; EPRI-CS-2452) Avail: NTIS HC A09/MF A01

The results of studies on corrosion chemistry in low-oxygen activity atmospheres that are characteristic of gasified or incompletely combusted coal are given. The objective was to identify those factors in alloy composition and structure and in gas composition and temperature that govern both the formation and eventual breakdown of protective-oxide scales in low-P sub O 2 to high-P sub S 2 atmospheres. It was found that protective chromic-oxide scales of uniform composition and structure formed only on cold-worked or ultrafine grain surfaces of alloys containing more than one percent Fe or Mn. Breakdown or failure of normally protective chromic-oxide scales was studied as a function of alloy composition (Fe, Ni, Co, Mn, Cr) and atmosphere conditions. The most protective scales were those formed on Ni-Cr alloys low in Fe and Mn. These scales failed eventually by mechanical breakdown; i.e., cracking or spalling. DOE

N83-25183# Department of Energy, Bartlesville, Okla.
LIQUID FOSSIL-FUEL TECHNOLOGY Quarterly Technical Report, Jan. - Mar. 1982
Jul. 1982 76 p
(DE82-020005; DOE/BETC/QPR-82/1) Avail: NTIS HC A05/MF A01

Highlights of research activities at Bartlesville Energy Technology Center for the quarter ending March 1982 are summarized. Major research areas are: liquid fossil fuel cycle; extraction (resource assessment and enhanced production); processing (characterization, thermodynamics, processing technology); utilization; and product integration and technology transfer. Special reports include: EOR data base, major new industry tool; properties of crude oils available via telephone hookup; alternative fuels data bank stresses transportation. DOE

N83-25184# Arkansas Power and Light Co., Little Rock.
CENTRAL ARKANSAS ENERGY PROJECT. COAL TO MEDIUM-BTU GAS Executive Summary

May 1982 16 p
(Contract DE-FG01-81RA-50552)
(DE82-017577; DOE/RA-50552/1220) Avail: NTIS HC A02/MF A01

The Central Arkansas Energy Project has as its objective the conversion of coal in a central location to a more readily usable energy source, medium Btu gas (MBG), for use at dispersed locations as fuel for power production and steam generation, or as a feedstock for chemical processing. The projecct elements consist of a gasification facility to produce MBG from coal, a pipeline to supply the MBG to the dispersed sites. The end of line users investigated were the repowering or refueling of an existing Arkansas Power and Light Co. Generating station, an ammonia plant, and a combined cycle cogeneration facility for the production of steam and electricity. Preliminary design of the gasification plant including process engineering design bases, process flow diagrams, utility requirements, system description, project engineering design, equipment specifications, plot plan and section plot plans, preliminary piping and instrument diagrams, and facilities requirements. Financial analyses and sensitivities are determined. Design and construction schedules and manpower loadings are developed. It is concluded that the project is technically feasible, but the financial soundness is difficult to project due to uncertainty in energy markets of competing fuels. DOE

N83-25185# Arkansas Power and Light Co., Little Rock.
CENTRAL ARKANSAS ENERGY PROJECT: COAL TO MEDIUM-BTU GAS, VOLUME 2 *Final Report*
May 1982 452 p
(Contract DE-FG01-81RA-50552)
(DE82-016339; DOE/RA-50552/1220-Vol-2) Avail: NTIS HC A20/MF A01

The feasibility of coal gasification on Arkansas was analyzed. The site selection and construction of a gasification plant are discussed. DOE

N83-25186# Department of Energy, Morgantown, W. Va.
COAL-GASIFICATION MODELING WORKSHOP PROCEEDINGS
M. Ghate, ed. and J. W. Martin, ed. 1982 468 p Workshop held in Morgantown, W. Va., 18 Jan. 1982
(DE82-017279; DOE/METC-82/24; CONF-820153) Avail: NTIS HC A20/MF A01

The stage of development and availability of models and computer codes of gasifier and downstream process modeling efforts in surface gasification were summarized. Experimental efforts in gasification were reviewed. The applicability and availability of data for model testing and validation was determined. A responsive dialogue and feedback loop between modelers and experimentalists to improve the synergism between these complementary efforts was established and information concerning requirements to obtain gasifier and downstream process models and computer codes which are verified and validated over known operating ranges are provided. DOE

N83-25187# Hydrocarbon Research, Inc., Lawrenceville, N. J.
LABORATORY PROGRAM TO SUPPORT H-COAL PILOT-PLANT OPERATIONS: VOLUME 2: PDU RUN 8
Feb. 1982 122 p
(Contract DE-AC05-77ET-10152)
(DE82-008213; DOE/ET-10152/T11-Vol-2; FE-2547-46-Vol-2) Avail: NTIS HC A06/MF A01

The H-coal pilot plant operations are reported. Topics discussed are: PDU solvent precipitation; solids separation; unit operations; normal shutdown; emergency procedures; trouble shooting. DOE

N83-25188# California Univ., Berkeley. Lawrence Berkeley Lab. Energy Efficient Buildings Program.
SUPPLY CURVES OF CONSERVED ENERGY Ph.D. Thesis
Alan Kevin Meier May 1982 121 p refs
(Contract DE-AC03-76SF-00098)
(DE82-020066; LBL-14686) Copyright. Avail: NTIS HC A06/MF A01

Supply curves of conserved energy provide an accounting framework that expresses the potential for energy conservation. The economic worthiness of a conservation measure is expressed in terms of the cost of conserved energy, and a measure is considered economical when the cost of conserved energy is less than the price of the energy it replaces. A supply curve of conserved energy is independent of energy prices; however, the economical reserves of conserved energy will depend on energy prices. Double-counting of energy savings and error propagation are common problems when estimating conservation potentials, but supply curves minimize these difficulties and make their consequences predictable. The sensitivity of the cost of conserved energy is examined, as are variations in the optimal investment strategy in response to changes in inputs. Guidelines are presented for predicting the consequences of such changes. DOE

N83-25189# Sandia Labs., Albuquerque, N. Mex.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 8: FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, NEW MEXICO
Feb. 1982 27 p refs
(Contract DE-AC04-76DP-00789)
(DE82-012060; SAND-81-7085/8-Vol-8) Avail: NTIS HC A03/MF A01

For the month of January, 1982, performance data are given for a grid-connected photovoltaic power supply at a New Mexico shopping center. Data presented include: daily and monthly energy produced; daily and monthly incident solar energy; daily and monthly array efficiency; plots of energy produced as a function of power level, voltage, cell temperature, and hour of the day; power conditioner input, output and efficiency for two individual units and for the total power conditioning system; daily and monthly photovoltaic energy supplied to the load and the corresponding dollar value for the month; photovoltaic system efficiency; capacity factor; daily system availability; daily and hourly insolation; daily and hourly ambient temperature; daily and hourly wind speed; wind direction distribution; heating and cooling degree days; number of freeze/thaw cycles; hourly cell temperature; daily data acquisition mode and recording interval plot. Also included are brief summaries of three operations-related events. DOE

N83-25190# Sandia Labs., Albuquerque, N. Mex.
DYNAMIC BEHAVIOR OF A CLASS OF PHOTOVOLTAIC CONVERTERS
O. Wasynczuk 1982 30 p refs Presented at IEEE Power Engr. Soc. Winter Meeting, New York, 30 Jan. 1982
(Contract DE-AC04-76DP-00789)
(DE82-019344; SAND-82-7075C; CONF-820134-2) Avail: NTIS HC A03/MF A01

The dynamic behavior of a specific photovoltaic design which utilizes the perturb and observe method of peak power tracking is discussed. It is shown that when the insolation does not vary with time, the perturb and observe method is able to converge to peak power conditions; however, when the insolation varies randomly at any substantial rate, the perturb and observe method fails to adequately track the peak power conditions. An alternate method of power tracking which utilizes the harmonic component of the array voltage and current to establish proper control action is examined. The performance of this method as compared to the perturb and observe method is demonstrated using a detailed hybrid simulation of the photovoltaic system. The design of the photovoltaic system and the detailed simulation of the various system components are described. DOE

N83-25191# Westinghouse Research and Development Center, Pittsburgh, Pa. Research and Development Center.
DEVELOPMENT OF COPPER SULFIDE/CADMIUM SULFIDE THIN-FILM SOLAR CELLS Technical Progress Report, 1 Apr. - 30 Jun. 1981
J. R. Szedon, W. J. Biter, and H. C. Dickey 8 Mar. 1982 31 p refs
(Contract DE-AC022-77CH-00178)
(DE82-013339; SERI/PR-8143-1-T7; TPR-8) Avail: NTIS

HC A03/MF A01

The complex effects that occur during the aging of Cu2S/CdS thin film solar cells in flowing wet oxygen were demonstrated. At constant illumination, the short circuit current of cells aged at room temperature consistently decreases with time. The second effect, related to diode opposing current, result from several competing mechanisms. Over the short term, the magnitude of diode opposing current decreases. After approx. 20 hours of aging, opposing current generally returns to the level achieved after hydrogen annealing which immediately preceded the aging sequence. There is no significant change in Cu2S transmission behavior for wavelengths ranging from 525 to 1000 nm during wet-oxygen aging for periods of 2 to 36 hours. The CdS grain structure details in the junction detector area is compared to an adjacent metallized area. DOE

N83-25192# Sandia Labs., Albuquerque, N. Mex.

DEPARTMENT OF ENERGY SOLAR-CENTRAL-RECEIVER ANNUAL MEETING

Feb. 1982 297 p Meeting held in Claremont, Calif., 13 Oct. 1981

(Contract DE-AC04-76DP-00789)

(DE82-011932; SAND-82-8002; CONF-8110176) Avail: NTIS HC A13/MF A01

Topics on solar energy central receivers were discussed. Discussions included sections on systems and component development. Also included is a list of Central Receiver Test Facility projects. DOE

N83-25193# Sandia Labs., Albuquerque, N. Mex.

REVIEW OF POLYMER USAGE IN THE DEVELOPMENT OF PROTOTYPE TROUGHS BY SANDIA NATIONAL LABORATORIES, ALBUQUERQUE (SNLA)

N. H. Clark and R. Champion 1982 8 p ref Presented at the 183rd Am. Chem. Soc. Ann. Meeting, Las Vegas, Nev., 27 Mar. 1982

(Contract DE-AC04-76DP-00789)

(DE82-001912; SAND-81-2240C; CONF-820304-3) Avail: NTIS HC A02/MF A01

The use of polymers as structural materials, adhesives, and coatings for parabolic trough reflectors is discussed. Four design concepts for producing panel reflectors are described relative to the role polymers play in them. DOE

N83-25194# Sandia Labs., Albuquerque, N. Mex.

ADVANCED CONCENTRATOR CELL RESEARCH AT SANDIA NATIONAL LABORATORIES

James Wiczer 1982 13 p Presented at the 8th Photovoltaic Concentrator Project Integration Meeting, Albuquerque, N. Mex., 27 Jan. 1982

(Contract DE-AC04-76DP-00789)

(DE82-005772; SAND-82-0224C; CONF-820114-1) Avail: NTIS HC A02/MF A01

During the past five years, Sandia National Laboratories in conjunction with the US Department of Energy has supported several research projects for advanced single junction and multijunction concentrator solar cells in compound semiconductor materials. These research projects have received over 3.5 million dollars in government support during this period. A brief review of the major, Sandia supported compound semiconductor cell development programs is presented. Highlights of these programs are outlined with some observations on current research efforts. In addition, a brief overview is presented on some diagnostic techniques recently developed at Sandia in support of these programs. A discussion of the recently completed lens analyzer for the study of chromatic aberrations in concentrator Fresnel lenses is included. DOE

N83-25195# Boeing Co., Seattle, Wash.

SOLAR PROJECT DESCRIPTION FOR CATHEDRAL SQUARE 10-STORY APARTMENT BUILDING, BURLINGTON, VERMONT

David Beers 15 Jan. 1982 66 p

(Contract DE-AB01-76CS-31020)

(DE82-010058; SOLAR/1060-82/50) Avail: NTIS HC A04/MF A01

A system is described for preheating domestic hot water (DHW) for a 10-story Vermont apartment building. The system consists of 2012 square feet of roof-mounted flat plate collectors, a 3000 gallon storage tank, a water-glycerol solution for heat collection and transfer, and a natural gas-fired hot boiler for auxiliary heating. The total system is described and diagrammed, and the design of the collector, storage, energy-to-load, and auxiliary subsystems are individually outlined. Five modes of operation are described: collector-to-storage; storage-to-DHW preheat; DHW storage-to-preheat; DHW circulation and distribution; and auxiliary-to-DHW heating. Performance evaluation instrumentation for the National Solar Data Network is also described. Original cost estimate for provisioning and installation of the solar energy system are given. DOE

N83-25196# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

HEAT REJECTION AND ENERGY EXTRACTION WITHIN SOLAR PONDS

Yogesh Jaluria Feb. 1982 56 p refs

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-009487; SERI/RR-252-1393) Avail: NTIS HC A04/MF A01

A study of the heat transfer and fluid flow processes governing heat rejection to the surface layer and energy extraction from the storage zone has been carried out. The literature available on this and other related problems was studied in detail to determine the nature of the recirculating flows that arise and the effect they might have on the stability of the gradient layer. Simplified analytical models were considered to determine the governing parameters and their effect on the performance and efficiency of the solar pond. Estimates of the surface temperature rise and the increase in evaporation caused by heat rejection were made. Two flow configurations, end-to-end and top-to-bottom, were considered for every extraction and the spread of the flow in the storage zone was studied. It was found that the limited penetration of the top-to-bottom configuration restricts its satisfactory operation to small ponds. DOE

N83-25197# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.

STRESS CORROSION OF A HIGH-TRANSMITTANCE GLASS FOR SOLAR APPLICATIONS

R. T. Coyle and J. D. O. McFadden Mar. 1982 22 p refs Presented at the Electrochem. Soc. Ann. Meeting, Denver, Oct. 1981

(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)

(DE82-009721; SERI/TP-255-1507; CONF-811013-23) Avail: NTIS HC A02/MF A01

The stress corrosion coefficients A and n in the relationship v = AK/sub I//sup n/ (where v is the crack velocity and K/sub I/ is the stress intensity) and the critical stress intensity factor K/sub IC/, for a new flat glass for solar energy applications were measured. It is found that this new glass has an n of 26.6, versus 17.9 for soda-lime-silicate float glass. It is implied that the 7809 has lower stress corrosion cracking susceptibility then the float glass. The critical stress intensity factor for the 7809 was 0.75 MP a/sq. foot m versus 0.71 for float glass. DOE

N83-25198# Synergic Resources Corp., Bala-Cynwyd, Pa.

EVALUATION OF DUAL-ENERGY-USE SYSTEMS. VOLUME 1: EXECUTIVE SUMMARY Interim Report

D. R. Limaye Oct. 1982 33 p refs Sponsored by EPRI 2 Vol. (EPRI Proj. 1276-8)

(DE83-900758; EPRI-EM-2695-Vol-1) Avail: NTIS HC A03/MF A01

The potential applications of industrial cogeneration and district heating are addressed. The following are described: purpose and objectives, project overview, major tasks, project schedule, industrial cogeneration case studies, list of cogeneration systems studied, cogeneration data base, summary of cogeneration

inventory, evaluation methodology, computer programs for screening and evaluation of DEUS, conceptual design of cogeneration systems in a pulp mill, West Coast mill results, conceptual design of cogeneration system for enhanced oil recovery, cogeneration systems Tosco site, preliminary evaluation of cogeneration potential in distillation columns, district heating survey, US vs European district heating technology, and utility participation in DEUS regulatory and financial aspects. DOE

N83-25199# Synergic Resources Corp., Bala-Cynwyd, Pa.
EVALUATION OF DUAL-ENERGY-USE SYSTEMS, VOLUME 2 Interim Report
D. R. Limaye Oct. 1982 250 p refs Sponsored by EPRI 2 Vol.
(EPRI Proj. 1276-8)
(DE83-900757; EPRI-EM-2695-Vol-2) Avail: NTIS HC A11/MF A01

The development of a methodology for evaluation of DEUS is described. Supporting computer programs for screening and evaluation of cogeneration options are described. The current status of the conceptual design and analysis of cogeneration systems for the pulp and paper industry, enhanced oil recovery and distillation columns respectively is presented. The results of a survey of district heating in the US are described and information is provided on European district heating technology and practices, which was developed as an initial activity in the conceptual design and analysis of district heating systems using European technology. The major regulatory and financial aspects of utility participation is DEUS are reviewed. DOE

N83-25200# Sargent and Lundy, Engineers, Chicago, Ill.
COMPRESSED-AIR ENERGY-STORAGE PRELIMINARY DESIGN AND SITE-DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 6: BALANCE OF PLANT DESIGN Final Report
Dec. 1982 514 p refs Sponsored by EPRI Prepared in cooperation with Public Service Co. of Indiana, Inc.
(Contracts DE-AC02-78ET-9232; ET-78-C-01-2159; EPRI Proj. 1081-3)
(DE83-005729; EPRI-EM-2351-Vol-6) Avail: NTIS MF A01

A study was performed to investigate the behavior and suitability of an aquifer-based compressed-air energy storage (CAES) plant. Plant design considerations for a CAES plant are discussed. More specifically, the design of the aboveground facilities including well locations, fuel oil storage, switchyards, facility access, plant and equipment arrangement, and process flow diagrams are given. DOE

N83-25201# Sargent and Lundy, Engineers, Chicago, Ill.
COMPRESSED-AIR ENERGY-STORAGE PRELIMINARY DESIGN AND SITE-DEVELOPMENT PROGRAM IN AN AQUIFER. VOLUME 9: COST ESTIMATE AND SCHEDULE Final Report
Dec. 1982 120 p ref Sponsored by EPRI Prepared in cooperation with Public Service Co. of Indiana, Inc.
(Contract DE-AC02-78ET-29232; EPRI Proj. 1081-3)
(DE83-005727; EPRI-EM-2351-Vol-9) Avail: NTIS HC A06/MF A01

The behavior and suitability of aquifers as compressed-air energy-storage sites is discussed. The engineering and construction schedule, facilities capital-cost estimate, and corresponding cash-flow requirements are given. DOE

N83-25202# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 14: FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, NEW MEXICO, JULY AND AUGUST 1982
Thomas D. Harrison Dec. 1982 48 p Prepared in cooperation with Sandia National Labs., Albuquerque, N. Mex.
(Contract DE-AC04-76DP-00789)
(DE83-005381; SAND-81-7085/14) Avail: NTIS HC A03/MF A01

Data accumulated during July and August at the intermediate photovoltaic project at Lovington Square Shopping Center, Lovington, New Mexico are presented. Generated energy and environmental (weather) data are presented graphically. Explanations of irregularities which are attributable to weather are provided. DOE

N83-25203# Thermo Electron Corp., Waltham, Mass.
PRELIMINARY INVESTIGATIONS OF THERMIONIC CONVERTERS UTILIZING HOTEMA AND DFVLR ELECTRODES
Michael Saunders, Lee Danielson, and Fred Huffman Nov. 1982 45 p refs
(Contract DE-AC02-76ET-11292)
(DE83-004107; TE-4258-442-82) Avail: NTIS HC A03/MF A01

Experiment results obtained from three thermionic converters using improved electrodes are reported. Two converters with ZrO2-Mo cermet electrodes produced by a low pressure plasma spray technique were fabricated and tested. The first of this pair of diodes was outgassed and operated at high temperatures and did not show improved thermionic performance. The second of the two was outgassed and operated at more moderate temperatures. An encouraging barrier index of 2.00 eV at T sub E = 14000K was recorded. Additionally, pre- and postoperational diagnostics confirmed that elemental concentrations on the emitter were nearly equal before and after operation. However, these electrodes did not give stable performance at emitter temperatures corresponding to practical output power densities. The Mo-Al2O3, Cr2O3 eutectic emitter developed by HOTEMA exhibited stable performances at emitter temperatures up to 16500K. The barrier index at T sub E = 14000K was 2.04 eV. The minimum collector work function as measured by the retarding plot method was 1.53 eV. DOE

N83-25204# Energy Systems Group, Inc., Atlanta, Ga.
SLR-PLUS VERSION 1.0 USER'S MANUAL
John M. Hill Nov. 1982 78 p refs
(Contract DE-AC02-82CH-10122)
(DE83-004109; DOE/CH-10122/9) Avail: NTIS MF A01

Version 1.0 of Solar Load Ratio heating plus cooling (SLR-PLUS), developed as an advanced passive solar system design and evaluation tool, is discussed. SLR-PLUS maintains the friendly user interface structure developed for the active solar system FCHART program. Users familiar with the FCHART programs and the FCHART/SLR program will find the operation of the SLR-PLUS program very familiar SLR-PLUS differs significantly from its parent program in three major ways. First, SLR-PLUS is strictly for the evaluation of passive solar energy systems. Second, the latest correlations from the Los Alamos National Laboratory serve as the basis to the passive heating analysis used by SLR-PLUS. Finally, SLR-PLUS includes cooling loads imposed by passive systems in the form of an annual cooling load for the building modelled and for the individual passive systems. The present version was developed on an Hewlett-Packard 1000 minicomputer using an RTE-IVB operating system. The present version requires approximately 22K 16-bit words of core with overlays to run. The FORTRAN source code will compile with minor changes on any FORTRAN 77 compiler. DOE

N83-25205# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: PINAL COUNTY
Don H. White and Larry A. Goldstone Aug. 1982 43 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004879; DOE/RA-50076/5) Avail: NTIS HC A03/MF A01

The market potential for utilizing geothermal energy was evaluated. Three suspected geothermal resource areas with potential 700 C temperatures were identified. One geothermal test well near Coolidge encountered bottom hole temperatures of 1200 C at a depth of 2440 m and produced 18.3 1/sec. It is found that geothermal resources occur near population centers where average growth rates of 1.5% to 2% per year are expected over the next 40 years. Mining, agriculture and manufacturing are all important sectors of the regional economy and povide opportunities for direct utilization of geothermal energy and 25 agricultural

firms were identified as having some potential for geothermal use, including the prepared feeds industry. DOE

N83-25206# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: COCHISE/SANTA CRUZ COUNTIES
Don H. White and Larry A. Goldstone Aug. 1982 49 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004880; DOE/RA-50076/6) Avail: NTIS HC A03/MF A01

The regional market potential for utilizing geothermal energy was evaluated. Three potential geothermal resource areas with potential for resource temperatures less than 900C (1940F) were identified. Population growth rates are expected to average 3% per year over the next 30 years in Willcox; Bowie and San Simon are expected to grow much slower. Regional employment is based on agriculture and copper mining, though future growth in trade, services and international trade is expected. A regional energy use analysis is included. Urban use, copper mining and agriculture are the principal water users in the region and substantial reductions in water use are anticipated in the future. The development plan identifies potential geothermal energy users in the region. Geothermal energy utilization projections suggest that by the year 2000, geothermal energy might economically provide the energy equivalent of 3,250,000 barrels of oil per year to the industrial sector. In addition, geothermal energy utilization might help stimulate an agricultural and livestock processing industry. DOE

N83-25207# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: GRAHAM/GREENLEE COUNTIES
Don H. White and Larry A. Goldstone Aug. 1982 56 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004881; DOE/RA-50076/8) Avail: NTIS HC A04/MF A01

The region wide market potential for utilizing geothermal energy was evaluated. Five potential geothermal resource areas with temperature less than 1000C were identified. Seven areas are inferred to contain higher temperature resources and the Clifton Hot Springs have electrical potential. Geothermal resources occur near Safford and Clifton, the two major population centers. Future population growth in the two counties is expected to average less than 2% per year over the next 40 years. Growth in the mining, trade and services economic sectors provide opportunities for the direct utilization of geothermal energy. A regional energy use analysis is included containing energy use and price projections. Water supplies are found to be adequate for urban needs, through agricultural and mineral water use may be limited in the future. A preliminary economic analysis for two district heating systems and a section matching geothermal resources to potential users is presented. DOE

N83-25208# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: YUMA COUNTY
Don H. White and Larry A. Goldstone Aug. 1982 41 p refs
(Contract DE-FC03-80RA-50076)
(DE83-004882; DOE/RA-50076/7) Avail: NTIS HC A03/MF A01

The potential for utilizing geothermal energy was evaluated. Four potential geothermal resource areas with temperatures less than 900C (1940F) were identified, and in addition, two areas are inferred to contain geothermal resources with intermediate temperature potential. The resource areas are isolated. One resource site contains a hot dry rock resource. Anticipated population growth in the county is expected to be 2% per year over the next 40 years. The primary employment sector is agriculture, though some light industry is located in the county. Water supplies are found to be adequate to support future growth without adverse affect on agriculture. In addition, several agricultural processors were found, concentrated in citrus processing and livestock raising. It is suggested that by the year 2000, geothermal energy may economically provide the energy equivalent of 53,000 barrels of oil per year to the industrial sector if developed privately. Geothermal utilization projections increase to 132,000 barrels of oil per year by 2000 if a municipal utility developed the resource. DOE

N83-25209# VTN Consolidated, Inc., Irvine, Calif.
HEBER KNOWN GEOTHERMAL RESOURCES AREA ETHANOL-FUEL FACILITY Final Technical Report
Sep. 1982 300 p refs
(Contract DE-FG03-80SF-11429)
(DE83-004775; DOE/SF-11429/1) Avail: NTIS HC A13/MF A01

A 20 million gallon per year ethanol fuel facility which will be built in a geothermal resource area is described. The feasibility study covers geothermal resource evaluation, process engineering, facilities engineering, marketing, economics and finance, and environmental analysis. DOE

N83-25210# Department of Energy, Washington, D. C. Div. of Advanced Energy Projects.
ADVANCED ENERGY PROJECTS: FY 1982 RESEARCH SUMMARIES
Oct. 1982 34 p
(DE83-003140; DOE/ER-0150) Avail: NTIS HC A03/MF A01

Projects in advanced energy are summarized. The following topics are included: program description; summaries of active projects; program data; an investigator index; and an institutional index. E.A.K.

N83-25211# Illinois Inst. of Tech., Chicago. Dept. of Mechanical Engineering.
FEASIBILITY OF A SMALL CENTRAL COGENERATED ENERGY FACILITY: ENERGY MANAGEMENT MEMORANDUM
Robert N. Porter Oct. 1982 31 p refs
(Grant DE-FG02-80CS-40337)
(DE83-005083; DOE/CS-40337/6; TM-82-6A) Avail: NTIS HC A03/MF A01

The thermal economic feasibility of a small cogenerated energy facility designed to serve several industries in the Stockyards area was investigated. Cogeneration options included two dual fuel diesels and two gas turbines, all with waste heat boilers, and five fired boilers. Fuels included natural gas, and for the fired boiler cases, also low sulphur coal and municipal refuse. For coal and refuse, the option of steam only without cogeneration was also assessed. The fired boiler cogeneration systems employed back pressure steam turbines. The refuse fired cases utilized electrical capacities, 8500 to 52,400 lbm/hr and 0 to 9.9 MW (e), respectively. Deficient steam was assumed generated independently in existing equipment. Excess electrical power over that which was displaced was sold to Commonwealth Edison Company under PURPA (Public Utility Regulatory Policies Act). The facility was operated by a mutually owned corporation formed by the cogenerated power users. DOE

N83-25212# West Texas State Univ., Canyon. Alternative Energy Inst.
WIND-ASSIST IRRIGATION AND ELECTRICAL-POWER GENERATION Final Report
Vaughn Nelson and Kenneth Starcher 13 Jul. 1982 26 p refs
(TENRAC EDF Proj. 78-W-4-1)
(DE83-900882; TENRAC/EDF-071) Avail: NTIS HC A03/MF A01

A wind turbine is mechanically connected to an existing irrigation well. The system can be operated in three modes: electric motor driving the water turbine pump. Wind assist mode where wind turbine supplements power from the utility line to drive the water turbine pump. At wind speeds of 12 m/s and greater, the wind turbine can pump water (15 kW) and feed power (10 kW) back into the utility grid at the same time. Electrical generation mode where the water pump is disconnected and all power is fed back to the utility grid. The concept is technically viable as the mechanical connection allows for a smooth transfer of power in

parallel with an existing power source. Minor problems caused delays and major problems of two rotor failures precluded enough operation time to obtain a good estimation of the economics. Because reliability and maintenance are difficult problems with prototype or limited production wind energy conversion systems, the expense of the demonstration project has exceeded the estimated cost by a large amount. DOE

N83-25213# Texas Technological Univ., Lubbock. Dept. of Mechanical Engineering.
DESIGN EVALUATION OF AN IMPROVED INDIRECT EVAPORATIVE COOLING SYSTEM Final Report
Jerry R. Dunn 28 Apr. 1982 62 p refs
(TENRAC Proj. 80-C-1-2)
(DE83-900876; TENRAC/EDF-067) Avail: NTIS HC A04/MF A01

The results of an investigation of an improved indirect evaporative cooling (TRC) system are presented. A cooling system concept which combines an indirect evaporative cooling unit with a conventional vapor compression refrigeration system was studied. In this system, initial cooling of outside air is performed in the IEC unit with additional cooling taking place across the evaporator coil of the conventional refrigeration unit before delivery to the conditioned space. The condenser coil rejects heat to the secondary (humidified) air stream of the IEC before it is discharged outdoors. A simulation model was developed to predict the performance characteristics of the concept for additional conditions beyond those used in the experimental test program. Principal output parameters from both the test program and simulation model included delivery air temperature, cooling capacity, and system COP. DOE

N83-25214# Arizona Univ., Tucson. Dept. of Chemical Engineering.
GEOTHERMAL DEVELOPMENT PLAN: MARICOPA COUNTY
Don H. White and Larry A. Goldstone Aug. 1982 80 p refs
Prepared for Arizona Solar Energy Commission, Phoenix
(Contract DE-FC03-80RA-50076)
(DE83-004876; DOE/RA-50076/2) Avail: NTIS HC A05/MF A01

The Maricopa County Geothermal Development Plan evaluated the market potential for utilizing geothermal energy. The study identified six potential geothermal resource areas with temperatures less than 1000C (2120F) and in addition, four suspected intermediate temperature areas (900 to 1500C, 1940 to 3000F). Geothermal resources are found to occur in and near the Phoenix metropolitan area where average population growth rates of two to three percent per year are expected over the next 40 years. Rapid growth in the manufacturing, trade and service sectors of the regional economy provides opportunities for the direct utilization of geothermal energy. A regional energy use analysis is included containing energy use and price projections. Water supplies are found to be adequate to support this growth, though agricultural water use is expected to diminish. The study also contains a detailed section matching geothermal resources to potential users. Two comparative analyses providing economic details for space heating projects are incorporated. DOE

N83-25215# Mitre Corp., McLean, Va. METREK Div.
TECHNOLOGY ASSESSMENT OF SOLAR-ENERGY SYSTEMS. MATERIALS RESOURCE AND HAZARDOUS MATERIALS IMPACTS OF SOLAR DEPLOYMENT
Yale M. Schiffman and Joan E. Tahami Apr. 1982 90 p refs
(Contract DE-AC01-80EV-10354)
(DE83-005048; MTR-82W59) Avail: NTIS HC A05/MF A01

The materials-resource and hazardous-materials impacts were determined by examining the type and quantity of materials used in the manufacture, construction, installation, operation and maintenance of solar systems. The materials requirements were compared with US materials supply and demand data to determine if potential problems exist in terms of future availability of domestic supply and increased dependence on foreign sources of supply. Hazardous materials were evaluated in terms of public and occupational health hazards and explosive and fire hazards. It is concluded that: although large amounts of materials would be required, the US had sufficient industrial capacity to produce those materials; (2) postulated growth in solar technology deployment during the period 1995-2000 could cause some production shortfalls in the steel and copper industry; the U.S. could increase its import reliance for certain materials such as silver, iron ore, and copper; however, shifts to other materials such as aluminum and polyvinylchloride could alleviate some of these problems. DOE

N83-25216# Argonne National Lab., Ill. Integrated Assessments and Policy Evaluation Group.
IDENTIFICATION OF DATA GAPS AND RESEARCH NEEDS FOR SOLID WASTES FROM SYNFUEL TECHNOLOGIES
L. Fradkin and D. G. Streets Mar. 1982 45 p refs
(Contract W-31-109-eng-38)
(DE83-000936; ANL/EES-TM-191) Avail: NTIS HC A03/MF A01

Solid wastes from coal gasification, coal liquefaction, and oil shale technologies are developing the basic and applied technology and data on which present and future fuel conversion and utilization processes depend. Data gaps are identified and research needs where warranted are recommended. DOE

N83-24929# Geological Survey, Washington, D. C.
THERMAL HISTORY OF THE GEORGES BANK BASIN
Michael A. Arthur *In its* Geol. Studies of the COST nos. G-1 and G-2 wells, U.S. North Atlantic Outer Continental Shelf 1982 p 143-152 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24967# California Univ., Berkeley. Lawrence Berkeley Lab.
THE BACA DEMONSTRATION PROJECT
G. S. Bodvarsson, M. Wilt, J. Delany, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 108-110 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24968# California Univ., Berkeley. Lawrence Berkeley Lab.
INJECTION OF COLD WATER INTO GEOTHERMAL RESERVOIRS
G. S. Bodvarsson, C. F. Tsang, K. Pruess, and M. J. OSullivan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 110-113 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24970# California Univ., Berkeley. Lawrence Berkeley Lab.
GENERIC STUDIES OF GEOTHERMAL RESERVOIR BEHAVIOR
K. Pruess, G. S. Bodvarsson, M. J. Lippmann, and A. H. Truesdell (U.S. Geological Survey) *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 115-118 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24973# California Univ., Berkeley. Lawrence Berkeley Lab.
SIMULATION OF THERMAL ENERGY STORAGE IN A DOUBLET WELL SYSTEM
T. A. Buscheck, C. Doughty, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 124-125 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24974# California Univ., Berkeley. Lawrence Berkeley Lab.
A DIMENSIONLESS PARAMETER APPROACH TO THE THERMAL BEHAVIOR OF AN AQUIFER THERMAL ENERGY STORAGE SYSTEM
C. Doughty, G. Hellstrom (Lund Inst. of Technology), C. F. Tsang, and J. Claesson (Lund Inst. of Technology) *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 126-128 refs (For primary document see N83-24933

14-42)
Avail: NTIS HC A09/MF A01

N83-24975# California Univ., Berkeley. Lawrence Berkeley Lab.
THE CHARACTERIZATION OF HEAT STORAGE IN CONFINED AQUIFERS WITH BUOYANCY FLOW
T. A. Buscheck and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 128-129 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24976# California Univ., Berkeley. Lawrence Berkeley Lab.
A COMPARATIVE STUDY OF FOUR MAJOR APPROACHES TO PREDICTING ATES PERFORMANCE
C. Doughty, T. A. Buscheck, G. S. Bodvarsson, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 129-132 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24977# California Univ., Berkeley. Lawrence Berkeley Lab.
OVERVIEW OF THE MEXICAN-AMERICAN COOPERATIVE PROGRAM AT THE CERRO PRIETO GEOTHERMAL FIELD
M. J. Lippmann and R. Zelwer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 133-138 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24985# California Univ., Berkeley. Lawrence Berkeley Lab.
NONEQUILIBRIUM, INTERPHASE MASS TRANSFER IN CHEMICAL TRANSPORT BY GROUNDWATER
C. L. Carnahan and J. S. Remer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 160-163 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-25217* National Aeronautics and Space Administration. Pasadena Office, Calif.
MOBILE SAMPLER FOR USE IN ACQUIRING SAMPLES OF TERRESTRIAL ATMOSPHERIC GASES Patent
Curtis E. Tucker (JPL, California Inst. of Tech., Pasadena) and Harold P. Holway, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 23 Mar. 1981 7 p Filed 23 Mar. 1981 Supersedes N81-24414 (19 - 15, p 2059) Sponsored by NASA (NASA-Case-NPO-15220-1; US-Patent-4,377,949; US-Patent-Appl-SN-246777; US-Patent-Class-73-863.31; US-Patent-Class-73-863.83; US-Patent-Class-73-864.63; US-Patent-Class-220-335) Avail: US Patent and Trademark Office CSCL 13B

Samples of terrestrial atmospheric gasses from a free body of such gasses using a device characterized by a plurality of tubular bodies adapted to be mounted in side by side relation on a motorized highway vehicle in mutual parallelism with the axis of the normal path of travel for the vehicles. Each of the bodies is of a cylindrical configuration and has an axial opening at each of its opposite ends through which a linear flow path is defined. A pair of pivotally supported, spring-biased sealing caps is mounted adjacent to the ends of the body and continuously urged into a hermetic sealing relationship. A restraint for securing the caps against spring-urged pivotal displacement, includes a separable, normally tensioned line interconnecting the caps and an operable release mechanism for simultaneously releasing the caps for spring-urged displacement. A hot wire cutter is included for separating the line, whereby samples of air are trapped in the body as the caps are spring-driven to assume an hermetically sealed relation with the openings defined in each of the opposite ends of the body.
Official Gazette of the U.S. Patent and Trademark Office

N83-25218# Oak Ridge National Lab., Tenn. Environmental Sciences Div.
ENVIRONMENTAL SCIENCES DIVISION REPORT Annual Progress Report, period ending 30 Sep. 1981
Apr. 1982 223 p refs
(Contract W-7405-eng-26)
(ORNL-5900; Publ-1900) Avail: NTIS HC A10/MF A01

Aquatic ecology activities reported include results from the growing projects on reservoir and stream studies and on Legionnaires' Disease Bacterium. Also included are the final results from the two long term projects on analysis and modeling of aquatic populations and ecosystems and on toxicant formation in condenser cooling systems. Research in the Environmental Resources Section included regional pattern analysis, large waterway regional analyses, regional analysis of likely impacts of coal production and use in the Western Kentucky area, regional wildlife habitat analysis, acidic deposition, and evaluation of potential conflicts between mineral deposits and renewable resources in the conterminous United States. Modeling studies included ecosystem risk analysis, the study of aggregation problems in ecology, and work on positive feedback in natural systems. Environmetrics emphasized organization, management, and reporting for several large data sets used for examining the effects of by products of synthetic fuel manufacture on various biota; reporting lower Mississippi River impacts studied by the U.S. Army Corps of Engineers; reporting gasifier research data from the University of Minnesota; studying global carbon issues; and correlating information in the Geoecology data base with country wide issues. Research park activities emphasized characterization of Oak Ridge Reservation communities, habitat studies for wildlife on an interagency basis, management of softwood plantations, and management and research on reservation wildlife populations. Author

N83-25219# PEDCo-Environmental, Inc., Cincinnati, Ohio.
ACID RAIN: COMMENTARY ON CONTROVERSIAL ISSUES AND OBSERVATIONS ON THE ROLE OF FUEL BURNING
M. F. Szabo, M. P. Esposito (Spaite (Paul W.) Co.), and P. W. Spaite Mar. 1982 211 p refs
(Contract DE-AC21-81MC-19170)
(DE82-016914; DOE/MC-19170/1168) Avail: NTIS HC A10/MF A01

Occurrence and effects of acid rain; natural and manmade sources of acid rain precursors; formation, transport, and deposition, measurement and monitoring, mathematical modeling; fuel trend analysis; and the impact of local sources are discussed. Author

N83-25220# General Accounting Office, Washington, D. C. Mission Analysis and Systems Acquisition Div.
SAN FRANCISCO'S WASTEWATER TREATMENT PROGRAM NEEDS REEXAMINATION AND BETTER MANAGEMENT
1 Feb. 1983 22 p refs
(GAO/MASAD-83-11; B-205654) Avail: NTIS HC A02/MF A01

Reexamination of certain aspects of San Francisco's Wastewater Treatment Program is recommended. Author

N83-25221# Department of Energy, Washington, D. C.
THE LONG RANGE TRANSPORT OF AIR POLLUTION
Donald H. Lewis and Richard H. Ball Jan. 1982 209 p refs
(DOE/EP-0037) Avail: NTIS HC A10/MF A01

Transport process, visibility, acid rain, health effects, mitigation of effects, and emission control strategies are discussed. Author

N83-25222# Wisconsin Univ., Madison.
CARBON DIOXIDE EFFECTS RESEARCH AND ASSESSENT PROGRAM. ENVIRONMENTAL AND SOCIETAL CONSEQUENCES OF A POSSIBLE CO2 INDUCED CLIMATE CHANGE. VOLUME 2, PART 1: RESPONSE OF THE WEST

ANTARCTIC ICE SHEET TO CO2-INDUCED CLIMATIC WARMING
Charles Bentley Apr. 1982 38 p 2 Vol.
(DOE/EV-10019/02-Vol-2-Pt-1) Avail: NTIS HC A03/MF A01

Satellite monitoring, grounding lines and other glacial features, components in the total mass balance, sea level changes, response to atmospheric temperature change, changes in boundary conditions, ice drilling and core studies, sea level and ocean volume studies, and the geologic records, are discussed. Author

N83-25223# Illinois Univ., Urbana.
GLOBAL DYNAMICS OF BIOSPHERIC CARBON. PROCEEDINGS OF SYMPOSIUM
Sandra Brown, ed. Washington, D.C. DOE Jul. 1982 206 p refs Symp. held at Ann. Meeting of the Ecol. Soc. of Am., Bloomington, Ind., 17 Aug. 1981; sponsored by the American Institute of Biological Sciences
(Contract DE-AS05-78EV-06047)
(CONF-8108131) Avail: NTIS HC A10/MF A01

Analyses of atmospheric CO2 data to determine the role of ecosystems in the regulation of atmospheric CO2 concentration, the response of plants to CO2 enrichment, state of knowledge of the magnitude of carbon pools in the major terrestrial biomes, state of knowledge of the magnitude of net carbon fluxes between the major terrestrial biomes and the atmosphere, and model simulations of the role of the terrestrial biota in the global carbon cycle. Author

N83-25224# Brookhaven National Lab., Upton, N. Y.
TRANSPORT, FATE AND EFFECTS OF ENERGY-RELATED POLLUTANTS: EVALUATION OF SURFACE AND GROUNDWATERS Progress Report
George R. Hendrey, Nicholas F. Gmur, and Edward T. Balzer, Jr. Sep. 1982 104 p refs
(Contract DE-AC02-76CH-00016)
(DE83-005711; BNL-51631; PR-3) Avail: NTIS HC A06/MF A01

The Acidification Chemistry Information Database (ACID) consists of 1,750,000 water sampling stations. Most of these data come from the EPA STORET system, which emphasizes downstream sites. However, 157 sources of data not included in STORET have contributed information on sites which, for the most part, are located toward the headwaters. Considerable effort went into obtaining complete records for many stations, especially with respect to geographic variables. Work in FY 1982 emphasized acquisition of data, but some preliminary analyses were conducted to identify sites with decreased alkalinity. Trend analyses found 689 stations to have significantly decreasing alkalinity concentrations. Those trend stations are listed and mapped on a state-by-state basis. The analysis of trends is still considered to be preliminary as the quality of the specific data sets was not yet verified. Data from ACID was provided to 14 individuals contracting with EPA on regional aspects of acid deposition. DOE

N83-25225# California Univ., Livermore. Lawrence Livermore Lab.
NUMERICAL SIMULATIONS OF ATMOSPHERIC RELEASES OF HEAVY GASES OVER VARIABLE TERRAIN
S. T. Chan, H. C. Rodean, and D. L. Ermak Aug. 1982 34 p refs Presented at the 13th NATO/CCMS Intern. Tech. Meeting on Air Pollution Modeling and Its Application, Toulon, France, 14-17 Sep. 1982
(Contract W-7405-eng-48)
(DE82-020351; UCRL-87256; CONF-820936-2) Avail: NTIS HC A03/MF A01

In this report, a three-dimensional, conservation equation model for simulating the dispersion of heavy gases has been described and used to simulate the vapor dispersion of two markedly different (regarding the role of gravity-flow) LNG spill experiments. Two numerical simulations of the NG dispersion were carried out for each experiment. The first assumed a flat terrain and the second used a numerical simulation of the actual terrain at the test site. In general, good agreement between model predictions and field measurements, regarding maximum downwind distances to the LFL, time histories of temperature and concentration at several representative locations, and concentration contours on certain horizontal and crosswind surfaces was observed. The overall results obtained in the model calculations with the simulated actual topography were shown to correlate much better with the field data. DOE

N83-25226# Sandia Labs., Albuquerque, N. Mex.
MODULAR AIRBORNE REMOTE SAMPLING AND SENSING SYSTEM (MARSSS)
R. O. Woods 1982 20 p Presented at the Specialty Conf. on In-situ Air Quality Monitoring from Moving Platforms, San Diego, Calif., 18 Jan. 1982
(Contract DE-AC04-76DP-00789)
(DE82-005691; SAND-81-1522C; CONF-820117-2) Avail: NTIS HC A02/MF A01

The modular airborne instrumentation system being developed will allow flexibility in the choice of instruments by standardizing mountings, power supplies, and sampling modes. The objective is to make it possible to perform aerial surveys from chartered aircraft that were not adapted in a more than superficial manner. It will also allow the experimenter to tailor his choice of instruments to the specific problem. Since the equipment will have a stand-alone capability, it can be applied to other problems such as long-term unattended use at remote locations or in toxic or otherwise hazardous environments. A description of the system is given. DOE

N83-25227# Texas Southern Univ., Houston. Dept. of Chemistry.
FIELD METHOD FOR SULFIDE DETERMINATION
Bobby L. Wilson and Ruldolph R. Schwarser 1982 18 p refs Presented at the 9th Ann. Meeting of Natl. Black Chemists and Chem. Engr., New York, 6 May 1982
(Contract DE-FG05-78ET-12339)
(DE82-017044; CONF-8205107-1) Avail: NTIS HC A02/MF A01

A simple and rapid method was developed for determining the total sulfide concentration in water in the field. Direct measurements were made using a silver/sulfide ion selective electrode in conjunction with a double junction reference electrode connected to an Orion Model 407A/F Specific Ion Meter. The method also made use of a sulfide anti-oxidant buffer (SAOB II) which consists of ascorbic acid, sodium hydroxide, and disodium EDTA. Preweighed sodium sulfide crystals were sealed in air tight plastic volumetric flasks which were used in standardization process in the field. Field standards were prepared by adding SAOB II to the flask containing the sulfide crystals and diluting it to the mark with deionized deaerated water. Serial dilutions of the standards were used to prepare standards of lower concentrations. Concentrations as low as 6 ppB were obtained on lake samples with a reproducibility better than + or - 10%. DOE

N83-25228# Mountain States Energy, Inc., Butte, Mont.
ENVIRONMENTAL MONITORING Annual Report
R. J. Derby Jul. 1982 19 p refs
(Contract DE-AC07-78ID-01745)
(DE82-021559; DOE/ID-01745/T1; Rept-2DOE-MHD-D91) Avail: NTIS HC A02/MF A01

The results of water quality, ambient air quality and background radiation monitoring programs are discussed. Comparisons are presented between air quality data. DOE

N83-25229# Brookhaven National Lab., Upton, N. Y. Process Sciences Div.
POSSIBLE STORAGE SITES FOR DISPOSAL AND ENVIRONMENTAL CONTROL OF ATMOSPHERIC CARBON DIOXIDE
F. L. Horn and M. Steinberg Sep. 1982 26 p refs
(Contract DE-AC02-76CH-00016)
(DE83-005993; BNL-51597) Avail: NTIS HC A03/MF A01

To control the increasing carbon dioxide in the atmosphere and mitigate its environmental effects, an investigation of possible storage sites for CO2 as liquid in depleted oil and gas wells and excavated salt domes was made. The storage capacity versus

CO2 production from the use of fossil fuels in the US for the three types of sites indicates low capacity for oil wells, intermediate for gas wells and high capacity for salt domes. Salt domes appear to provide CO2 storage for many decades, but at an annual excavation cost in the tens of billions of dollars amounting to minimum of 13% of the total cost of power production which includes removal and storage of CO2. The total cost of removal, recovery and storage of CO2 from power plants could almost double the total conventional cost of power production utilizing fossil fuel. DOE

N83-25230# Washington Univ., Seattle. Coll. of Ocean and Fishery Sciences.
POLLUTANT TRANSFER AND SEDIMENT DISPERSAL IN THE WASHINGTON-OREGON COASTAL ZONE Progress Report, 1 Aug. 1981 - 31 Jul. 1982
Barbara M. Hickey, comp. 30 Jul. 1982 13 p refs
(Contract DE-AT06-76EV-71025)
(DE83-004912; DOE/EV-71024/49) Avail: NTIS HC A02/MF A01

Physical, chemical, geological, and biological processes and their interrelationships in the coastal zone of the Pacific Northwest are discussed. Substantial progress was made in developing new conceptual and analytical tools for identifying, analyzing, and quantifying important processes in the transfer of energy and biomass within this ecosystem. Major accomplishments are summarized in research on physical oceanography and sediment transport. DOE

N83-25231# Institute of Gas Technology, Chicago, Ill.
ENVIRONMENTAL ASSESSMENT OF THE HYGAS PROCESS. VOLUME 4: HYGAS ENVIRONMENTAL CHARACTERIZATION. HYGAS TESTS 65 THROUGH 76 Interim Report
Louis J. Anastasia, Robert J. Evans, Steven J. Bossart, Richard H. Karst, and Chu-Sheng Juan Feb. 1982 241 p
(Contract DE-AC01-76ET-10261)
(DE82-011012; DOE/ET-10261/T5-Vol-4; FE-2433-27-Vol-4) Avail: NTIS HC A11/MF A01

HYGAS pilot plant streams were systematically sampled and analyzed to determine the fate of potential pollutants generated during coal gasification. Data acquisition and interpretation for pilot plant tests using a washed Illinois No. 6 bituminous coal from Peabody Min 10 were discussed. The pilot plant units of interest include the pretreater and gasifier reactors, which are considered scalable to larger HYGAS coal gasification plants. The fates of the following environmentally significant coal constituents were studied during pretreatment: sulfur compounds, nitrogen compounds, trace elements, and analyzed: coal feeds, pretreated chars, overhead fines, tars and oil, quenched water, and quenched off-gas. DOE

N83-25232# Los Alamos Scientific Lab., N. Mex.
DIFFERENTIAL-ABSORPTION LIDAR TECHNOLOGY FOR LIGHT TWIN-ENGINE AIRCRAFT OPERATION Final Report
Robert Karl and Harold Argo Nov. 1982 26 p refs
(Contract W-7405-eng-36)
(DE83-003888; LA-9568-MS) Avail: NTIS HC A03/MF A01

A survey of all relevant, gas phase, environmentally important pollutants was performed to identify every accessible spectroscopic feature for differential absorption LIDAR (light detection and ranging) probing. In addition, a comparison was made between all laser types for their ability to deliver sufficient energy at the appropriate wavelength to provide adequate signal to noise of the return for accurate range resolved concentration measurements. Special consideration was given to all of the features necessary for operation of such a system in a light twin-engine aircraft. This highly mobile system requires reliability, light-weight compact size, constant laser output for flight sampling period, and an unambiguous analysis method from the chosen detector system. Such a system will allow fast and accurate remote sensing of emissions or ambient levels for research or monitoring. DOE

N83-25233# Brookhaven National Lab., Upton, N. Y.
LESSENING THE SCOPE OF FEDERAL COASTAL ZONE MANAGEMENT: WHAT'S AT STAKE
E. Kaplan and R. Ritschard (California Univ., Lawrence Berkeley Lab.) Jun. 1982 49 p refs
(Contracts DE-AC03-76SF-00098; DE-AC02-76CH-00016)
(DE83-004048; LBL-14164; BNL-30948) Avail: NTIS HC A03/MF A01

The coastal zone management (CZM) program is discussed. The present scope of federal and state involvement in coastal zone management is reviewed particularly in relation to energy development. The impact of decreased federal coastal zone funding is outlined. Important issues of national interest and consistency are reviewed using specific examples. The need for an effective coastal planning and management scheme is discussed. DOE

N83-25234# California Univ., Berkeley. Lawrence Berkeley Lab. Building Ventilation and Indoor Air Quality Program.
EXCLUSION-LIST METHODOLOGY FOR WEATHERIZATION PROGRAM IN THE PACIFIC NORTHWEST
A. V. Nero, I. Turiel, W. J. Fisk, J. R. Cirman, and C. W. Traynor May 1982 91 p refs Sponsored in part by the Bonneville Power Administration
(Contract DE-AC03-76SF-00098)
(DE83-004051; LBL-14467) Avail: NTIS HC A05/MF A01

The list of excluded classes of homes are examined and an approach for modifying that list in order to increase the number of houses for which infiltration-reducing measures are offered is delineated. The nature of the weatherization program, particularly with respect to infiltration reduction, what is known about the sources and concentrations of indoor pollutants, as well as their health effects are surveyed. Techniques for controlling levels of indoor pollutants, whether by source control or by ventilation and air cleaning, are reviewed. The main considerations relevant to changes in the exclusion list and for formulating the elements that ought to be available in conjunction with such alterations are identified. It is concluded that the two major exclusion classes, that for radon has the greatest potential for reformulation in he near future to permit offering of infiltration-reducing measures to a significantly larger number of homes than at present; a comparable basis for changing the wood-stove exclusion does not yet exist. DOE

N83-25235# Oregon State Univ., Corvallis. School of Oceanography.
INCREASE OF TOTAL CO SUB 2 IN THE WORLD OCEANS Annual Progress Report
Chen-Tung A. Chen 3 Sep. 1982 6 p refs
(Contract DE-AT06-81EV-10611)
(DE83-004868; DOE/EV-10611/2) Avail: NTIS HC A02/MF A01

The major accomplishments in the investigation of the increase of CO2 in the world oceans are reported. New instrumentation was developed, library samples collected previously were analyzed, and samples were collected from two cruises, one in the Weddell Sea and one in the north Pacific Ocean. DOE

N83-25236# Wisconsin Legislative Council, Madison. Special Committee on Acid Rain.
ACID RAIN: A BACKGROUND REPORT
L. Glustrom and J. Stolzenberg 8 Jul. 1982 72 p refs
(DE83-901079; NP-3901079) Avail: NTIS HC A04/MF A01

The issue of acid rain is reported. The controversies surrounding the measurement, formation and effects of acid rain are reviewed. The term acid rain is used to describe the deposition of acidic components through both wet deposition and dry deposition background information on state agency activities relating to acid rain in Wisconsin is presented. What is known about the occurrence of, susceptibility to and effects of acid rain in Wisconsin is discribed and information related to man made sources of sulfur and nitrogen oxides in Wisconsin is provided. Major policies and regulations relating to acid rain which were or are developed jointly by the United States and Canadian governments, by the State of

Wisconsin are outlined. Possible areas for Committee action are discussed. DOE

N83-25237# Florida International Univ., Miami. Dept. of Biological Sciences.
ENERGY-RELATED POLLUTION OF SEMI-TROPICAL AND TROPICAL NEARSHORE ECOSYSTEMS Annual Report
Anitra Thorhaug and Jeffrey H. Marcus 1982 20 p
(Contract DE-AS05-79EV-10049)
(DE83-005136; DOE/EV-10049/1) Avail: NTIS HC A02/MF A01

The major components of the nearshore marine ecosystems in the subtropics and tropics (seagrasses, mangroves, and corals) are examined and compound sublethal and lethal effects from extremes in some energy-related effects (temperature, salinity and light) are discussed. DOE

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-25238*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
STUDY OF THE TIME EVOLUTION OF THE LITHOSPHERE Final Report, 1 Mar. 1981 - 31 Mar. 1983
Micheline C. Roufosse May 1983 22 p
(Grant NAG5-150)
(NASA-CR-170337; NAS 1.26:170337) Avail: NTIS HC A02/MF A01 CSCL 08G

The behavior and mechanical properties of the lithosphere were studied. This is a prerequisite to an understanding of the mechanisms and processes that occur in the Earth's mantle, which are masked by the lithospere. Geoid heights derived from the GEOS-3 and SEASAT radar altimeters were used. The correlation between bathymetry and geoid heights gives information on the mechanical properties of the lithosphere, such as its thickness, which is related to the age of the lithospheric plate. By probing in several locations spanning various temporal situations, the time evolution of the lighospheric plates were retraced. S.L.

N83-25239# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
REPORT ON THE STATUS AT DSR/INPE ON APPLYING REMOTE SENSING TO GEOLOGY [RAPPORT DU STAGE REALISE AU D.S.R./INPE SUR LES APPLICATIONS DE LA TELEDETECTION A LA GEOLOGIE]
Kalala Muamba Muana Lukanda Jan. 1983 43 p refs In PORTUGUESE; ENGLISH summary
(INPE-2633-RPE/426) Avail: NTIS HC A03/MF A01

The objective of the training course was on how to use remote sensing techniques applied to geology, and later on, to use the knowledge and experiences gained at two rural development projects located in the provinces if Shaba and Bandundu (Zaire). The knowledge and experiences acquired at INPE, with special emphasis on Remote Sensing applications to Geomorphology and Geology are summarized. Author

N83-25240# Lulea Univ. (Sweden). Dept. of Structural Engineering.
ACTIVE EARTH PRESSURE BUILD-UP. A TRIGGER MECHANISM IN LARGE LANDSLIDES IN SENSITIVE (QUICK) CLAYS
Stig Bernander [1982] 15 p refs
(TR-1981:49T; ISSN-0349-3571) Avail: NTIS HC A02/MF A01

A local failure (drained or undrained) in a slope may develop progressively into a large landslide involving not only the entire slope but also adjoining areas of virtually stable, some times even horizontal, ground. Theory and applications of numerical analysis on progressive failures are analyzed. The immediate cause or trigger mechanism which initiates the dynamic phase of a spontaneous slide is discussed. Author

N83-25241# Lulea Univ. (Sweden). Div. of Rock Mechanics.
THE STIFFNESS OF JOINTS
Graham Swan, ed. Jun. 1981 220 p refs Workshop held at Lulea, Sweden, Nov. 1980
(Tulea-1981:22; ISSN-0347-0881) Avail: NTIS HC A10/MF A01

The prediction of rock mass deformability is an essential part in the majority of rock mechanics investigations. Two approaches are currently used: empirical correlation (classification systems using various material property estimates), and analytic, numerical and experimental component modelling (finite element calculations using joint elements, analytic methods with various assumptions and composite, elastic models). The second approach requires a knowledge of joint stiffness both under normal and shear loads. Author

N83-25242# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MAXIMUM ENTROPY SPECTRAL ANALYSIS OF GEOMAGNETIC DISTURBANCE INDICES
R. P. Kane Mar. 1983 28 p refs Submitted for publication
(INPE-1693-RPE/120) Avail: NTIS HC A03/MF A01

Using the method of maximum entropy spectral analysis, the spectra of geomagnetic disturbance indices Ap, AN, As, AE, AU, AL, Dst and cosmic ray neutron intensity are obtained from daily means and for longer periods from monthly means. A large number of peaks of periodicities from 2 days to several years is obtained, many of which are shown by all the indices. Some of these are harmonics of the 27 days solar rotation period and the 10.2 years sunspot cycle period. S.L.

N83-25243# European Space Agency, Paris (France).
PROJECT BIRAMIS: MEASUREMENT OF THE EARTH RADIATION BUDGET BY ACCELEROMETRIC SATELLITE
Anne-Marie Mainguy Jan. 1983 174 p refs Transl. into ENGLISH from "Projet Biramis: Mesure du Bilan de l'Atmosphere par Satellite Accelerometrique" ONERA, Paris rept. ONERA-NT-1981-7
(ESA-TT-761; ONERA-NT-1981-7) Avail: NTIS HC A08/MF A01

The Earth radiation budget by space accelerometry (BIRAMIS project) was measured. The various causes of error are analyzed: they originate from the operation of the Super-Cactus accelerometer, from the characteristics of the coating chosen and from the existence of accelerations of others origins (spurious accelerations). Two numerical programs were developed, one simulating the measurement, the other estimating the local budget and the associated standard deviation as a function of the errors. Author

N83-25244# Army Engineer Topographic Labs., Fort Belvoir, Va. Photo/Electronic Survey System Branch.
RAPID GEODETIC SURVEY SYSTEM (RGSS) DEFLECTION OF THE VERTICAL AND GRAVITY ANOMALY TESTS AT WHITE SANDS MISSILE RANGE, 1980 Progress Report, 1 Apr. 1980 - 1 Apr. 1981
Mark Todd Oct. 1982 41 p refs
(AD-A124197; ETL-0308) Avail: NTIS HC A03/MF A01 CSCL 08/5

In early October 1979, the Defense Mapping Agency (DMA) contacted the Engineer Topographic Laboratories (ETL) for assistance in developing advanced surveying capabilities. DMA has the responsibility to provide large quantities of geodetic and gravimetric control. The large number of deflection stations and the precision required at each station created particular concern since first-order astronomic observations, combined with precision geodetic surveys, had to be made at each site. Because of the skill levels and labor-intensive methods required for astronomic observations, alternative, less demanding techniques to determine deflection of the vertical were needed. Inertial survey systems, such as the RGSS, made by Litton, and the Inertial Positioning System-2 (IPS-2), made by Honeywell, provide an attractive possible solution to the deflection of the vertical problem. Previous tests conducted under special conditions with the RGSS indicated that inertial techniques can transfer deflections to the required order of accuracy and can provide them faster and more economically than conventional means. The objective was to perform a

series of field tests with the RGSS to determine its current capabilities to measure changes in the deflection of the vertical and, if possible, to determine the hardware and software modifications required to improve accuracy. Author (GRA)

N83-25245# Emmanuel Coll., Boston, Mass.
PHASE AND AMPLITUDE SCINTILLATION STATISTICS AT 244 MHz FROM GOOSE BAY USING A GEOSTATIONARY SATELLITE Scientific Interim Report
Sunanda Basu, Santimay Basu, Robert C. Livingston (SRI International), Eileen MacKenzie, and Herbert E. Whitney (AFGL) Hanscom AFB, Mass. AFGL 6 Aug. 1982 64 p refs
(Contract F19628-81-K-0011; AF Proj. 4643; DNA Proj. 2029)
(AD-A124291; AFGL-TR-82-0222; AFGL-ERP-787) Avail: NTIS HC A04/MF A01 CSCL 04/1

Phase and amplitude scintillation measurements made at 244 MHz from Goose Bay using the geostationary satellite FLEETSAT are presented. An extended dynamic range receiver with an extremely stable local oscillator measured the phase variations with the precision of a coherent system subject to certain limitations. The data were obtained for a 10-month period in 1979 during a high sunspot epoch to extend the limited temporal coverage of orbiting Wideband satellite data. The report presents scintillation statistics in the manner required for communications system planning. The nighttime phase scintillations showed maximum occurrence during the spring and increased greatly in relation to the amplitude scintillations during times of significant magnetic activity. The increase of phase scintillations in relation to amplitude scintillations was attributed to an enhanced ionospheric drift during times of magnetic disturbances. The phase spectral index of the FLEETSAT data was found to be larger than that determined from Wideband data. To further our understanding of auroral irregularity generation mechanisms, this report also presents a case study of energetic particle precipitation spectra, the topside thermal density response of such precipitation and the coordinated phase and amplitude perturbation spectra created by such an energy input into the ionosphere. GRA

N83-25246# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.
MARINE ATMOSPHERIC BOUNDARY LAYER MODELING FOR TACTICAL USE Technical Progress Report, Oct. 1981 - Oct. 1982
Kenneth L. Davidson, G. E. Schacher, C. W. Fairall (BDM Corp.), Patricia Jones Boyle, and D. A. Brower Sep. 1982 50 p refs
(AD-A123317; NPS63-82-001) Avail: NTIS HC A03/MF A01 CSCL 04/1

The properties of the lower atmosphere are very important in the operation of many systems. Of particular importance is the effect on electromagnetic propagation for the full range from optical to radio wavelengths. Small scale fluctuations and aerosols severely affect optical propagation, Large scale changes in the index of refraction cause bending of RF and microwaves, leading to ducting, fading, and a host of other phenomena. Experimental assessment of atmospheric properties can only be done occassionally and on a widely separated basis. Author (GRA)

N83-25247# Air Force Geophysics Lab., Hanscom AFB, Mass. Space Physics Div.
STRUCTURE AND DYNAMICS OF THE WINTER POLAR CAP F REGION Interim Report
J. Buchau, B. W. Reinisch (Lowell Univ.), E. J. Weber, and J. G. Moore 3 Sep. 1982 30 p refs
(AF Proj. 4643)
(AD-A123706; AFGL-TR-82-0258; AFGL-ERP-792) Avail: NTIS HC A03/MF A01 CSCL 04/1

Ground based and airborne measurements of auroral emissions in ionospheric structure in the polar cap, conducted by the AFGL airborne ionospheric Observatory (AIO), have shown the structure and drift of polar cap F-layer auroras. Results from these measurements show three types of polar cap ionospheric structure. In this paper we briefly describe auroral dynamics measured by an All-Sky Imaging Photometer (ASIP). These optical measurements provide a framework in which to interpret the ionospheric sounder data from the Digisonde 128 PS. Author (GRA)

N83-25248# Air Force Geophysics Lab., Hanscom AFB, Mass.
AEROSOL MEASUREMENTS WITH A HIGH RESOLUTION SPECTROMETER. ENVIRONMENTAL RESEARCH PAPERS Summary Report
Frank K. Dearborn 16 Aug. 1982 41 p refs
(AF Proj. 6687)
(AD-A123691; AFGL-TR-82-0235; AFGL-ERP-789) Avail: NTIS HC A03/MF A01 CSCL 04/1

A short-history of the development and design of the AFGL/Epsilon Labs balloon-borne aerosol particle spectrometer is presented. Measurement results for a majority of the flights conducted with this instrument are summarized and presented in a compatible graphic format to facilitate intercomparison. An improved method of computing air flow and a means of correcting erroneous air flow data is described which should permit the re-evaluation and corrections of early flight data. Application of the foregoing corrective methods to the most recent flight data is detailed. Some pecularities in this high resolution data are described and a tentative explanation is proposed. Author (GRA)

N83-25249# Alaska Univ., Fairbanks. Geophysical Inst.
AURORAL HIGH LATITUDE MORPHOLOGY AND DYNAMICS Final Report, 16 Feb. 1979 - 16 Jun. 1982
S.-I. Akasofu Hanscom AFB, Mass. AFGL 16 Sep. 1982 49 p refs
(Contract F19628-79-C-0067; AF Proj. 4643)
(AD-A123381; AFGL-TR-82-0248) Avail: NTIS HC A03/MF A01 CSCL 04/1

Geomagnetic storms arise from a large-scale electrical discharge process surrounding the earth and it has been known that they are one of the most serious natural hazards to the Defense Systems. One possible solution to this hazard is: (1) to forecast accurately the occurrence and intensity of geomagnetic storms, (2) to alert all warning systems which would fail during geomagnetic storms, and (3) to mobilize emergency systems to supplement them. Thus, the accuracy of forecasting the occurrence and intensity of geomagnetic storms is of utmost importance. Reliable forecasting would be able to reduce drastically expenses involved in mobilizing these emergency systems. Author (GRA)

N83-25250# Defense Mapping Agency Hydrographic and Topographic Center, Washington, D.C.
POLAR MOTION PREDICTION ANALYSIS Final Report
William H. Wooden, II Feb. 1983 61 p refs
(AD-A124198) Avail: NTIS HC A04/MF A01 CSCL 08/5

The practical application of relating the Earth's crust to inertial space in near real-time requires that the Earth's pole position be predicted. Utilizing software which is used in the DMAHTC TRANSIT precise ephemeris operation, predictions of pole positions were made at 5-day increments from 5 to 30 days for BIH smoothed Circular D data, DMAHTC Polar Monitoring Service (DPMS) data, and BIH astrometry data. By examining 1980 and 1981 data, a confidence level between BIH smoothed Circular D values and Doppler predicted values as a function of prediction time has been established. At a 15-day prediction, the rms errors of the Doppler predictions with respect to the BIH smoothed Circular D values are 0.02 for both the X and Y components of pole position. GRA

N83-25251*# Stanford Univ., Calif. Inst. for Plasma Research.
INTERPLANETARY MAGNETIC FIELD AND TROPOSPHERIC CIRCULATION
John M. Wilcox, Philip H. Scherrer, and J. Todd Hoeksema Oct. 1982 58 p refs Presented at the 2nd Intern. Symp., Solar-Terrest. Influences on Weather and Climate, Boulder, Colo., Aug. 1982
(Contracts NAS5-24420; N00014-76-C-0207; Grants NSF ATM-77-20580; NGR-05-020-559)
(NASA-CR-170277; NAS 1.26:170277; AD-A123577; SU-SUIPR-945) Avail: NTIS HC A04/MF A01 CSCL 08/14

The relation between interplanetary magnetic sector boundary

crossings and areas of high vorticity in the troposphere that was reported during 1963-1973 cannot be investigated in the years after 1973 because of changes in the processing of the 500 mb height grids prepared by the National Meteorological Center. In particular, we cannot say that the effect disappeared. The same applies to vorticity computed from NMC winds grids. The Limited Area Fine Mesh grid has a large noise in computed vorticity after December 3, 1974. Therefore the interesting analysis of Larsen and Kelley cannot be extended. They had found that forecasts of Vorticity Area Index were significantly poorer after a sector boundary. Author (GRA)

N83-25252# Air Force Geophysics Lab., Hanscom AFB, Mass.
TIDES IN THE THERMOSPHERE: A REVIEW. ENVIRONMENTAL RESEARCH PAPERS
J. M. Forbes and K. S. W. Champion 13 Sep. 1982 44 p refs (AF Proj. 6690)
(AD-A124314; AFGL-TR-82-0264; AFGL-ERP-793) Avail: NTIS HC A03/MF A01 CSCL 04/1

A comprehensive review of recent theoretical and observational accomplishments relating to diurnal and semidiurnal tidal oscillations of neutral winds, temperature, density, and composition above 100 km is presented. Topics emphasized include: Recent theoretical studies; Solar cycle, seasonal, and latitudinal variations in tidal oscillations of temperature and winds as inferred from Thomson scatter measurements; Tidal variations in total mass density and composition as inferred from satellite accelerometer and mass spectrometer measurements; Comparison of recent theoretical models with the above observations; The relative influence of in situ and propagating tides in determining the total semidiurnal thermospheric tide; and Propagating tides of lower atmosphere origin as a source of mean momentum and heat in the lower thermosphere. GRA

N83-25253# Air Force Geophysics Lab., Hanscom AFB, Mass. Optical Physics Div.
SPECTROSCOPIC PARAMETERS FOR OZONE FROM INFRARED AND ULTRAVIOLET TECHNIQUES Scientific Interim Report
S. M. Adler-Golden (Spectral Sciences, Inc.) and R. A. Armstrong 12 Aug. 1982 22 p refs
(AF Proj. 2310)
(AD-A124315; AFGL-TR-82-0231; AFGL-ERP-788) Avail: NTIS HC A02/MF A01 CSCL 04/1

The spectral contribution of ozone in the upper atmosphere is a function of the vibrational levels populated in the formation reaction and the time-dependent behavior of those levels. A qualitative analysis of the spectroscopic and Einstein coefficients behavior based on infrared and ultraviolet techniques is presented. GRA

N83-25254# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SEISMIC DISCRIMINATION Final Report, 1 Apr. - 30 Sep. 1982
Michael A. Chinnery 30 Sep. 1982 115 p
(Contract F19628-80-C-0002; ARPA Order 512; AF Proj. 2A10)
(AD-A124322; ESD-TR-82-099) Avail: NTIS HC A06/MF A01 CSCL 08/11

This is the Final Report on the Lincoln Laboratory Vela Uniform program. Section I presents an overview of the program from its beginning; summaries of our technical accomplishments for the Fiscal Years 1964 through 1982 are presented in Sec. II. The implementation of the Seismic Data Center is described in Sec. III. A list of publications relevant to our research is supplied in Sec. IV. GRA

N83-25255# Range Commanders Council, White Sands Missile Range, N. Mex. Meteorology Group.
KWAJALEIN MISSILE RANGE, KWAJALEIN, MARSHALL ISLANDS RANGE REFERENCE ATMOSPHERE 0-70 Km ALTITUDE
1982 185 p refs Supersedes IRIG-104-63-Pt-1
(AD-A123424; RCC/MG-360-82; IRIG-104-63-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 04/2

Atmospheric parameters are essential to the research and development of missiles and aerospace vehicles. The need for realistic atmospheric models derived in a consistent manner for each of the several major test ranges was recognized in the early 1960's. An atmospheric model which is derived from statistical data for a particular geographical location is referred to as a reference atmosphere. This committee, Task MG-1, establishes RRAs Range Reference Atmospheres for the several ranges as provided by the RCC Range Commander's Council. An RRA is a model of the Earth's atmosphere over a geographical location of interest for use by DOD and other U.S. Government range users. The RRA is used to provide planning data for evaluating environmental constraints for the particular configurations of environment-sensitive systems and components being developed or undergoing tests. Using the best available upper atmosphere data base to include rawinsonde, rocketsonde and possibly other high-altitude data sources for the range location, the task is to establish a model of certain statistics for wind and thermodynamic quantities derived in a uniform manner and published in a standardized format. GRA

N83-25256# Tri-Con Associates, Inc., Cambridge, Mass.
RESEARCH, DESIGN AND DEVELOPMENT STUDY TO MEASURE ATMOSPHERIC OPTICAL TURBULENCE Final Report, 1 Jan. 1981 - 30 Sep. 1982
Robert S. Hills 15 Nov. 1982 42 p
(Contract F19628-81-C-0041; AF Proj. 6687)
(AD-A123392; C-201; AFGL-TR-82-0334) Avail: NTIS HC A03/MF A01 CSCL 04/1

This report describes work performed in support of the AFGL program to study atmospheric turbulence and obtain the Atmospheric Optical Structure Constant, C sub N squared. Data is obtained from a thermosonde unit and a radiosonde unit carried aloft by small weather balloons. Improvements in the thermosonde unit and modifications to the radiosonde unit are described. Author (GRA)

N83-25257# Utah Univ., Salt Lake City. Dept. of Meteorology.
PARAMETERIZATION OF BROADBAND SOLAR RADIATION TRANSFER IN CLEAR AND CLOUDY ATMOSPHERES Report, 1 Aug. 1981 - 30 Sep. 1982
Keith Hutchison and Kuo-Nan Liou 30 Sep. 1982 116 p refs
(Contract F19628-81-K-0042; AF Proj. 2310)
(AD-A123396; SCIENTIFIC-1; AFGL-TR-82-0364) Avail: NTIS HC A06/MF A01 CSCL 04/1

This report describes a parameterization model for computing solar heating rate and net flux profiles in clear and cloudy atmospheres. Specifically, the model is designed to allow global circulation and climate modelers maximum flexibility when treating the effects of clouds on the atmosphere. Gaseous water vapor, ozone and carbon dioxide are the absorbers considered in the clear atmosphere. The effect of Rayleigh scatter on net flux profiles is also discussed. The parameterization method is compared with results obtained by the discrete ordinate method and the comparisons for heating rate and net flux profiles are excellent for all solar zenith angles and surface albedos in the range 0.0-1.0. Reflection and transmission for cumulus, altostratus, cirrus and stratus are parameterized to allow variations in solar zenith angle, cloud thickness, and mean cloud temperature. The latter dependence means the cloud base becomes an independent variable. GRA

N83-25258# West Virginia Univ., Morgantown.
STRUCTURAL GEOLOGY OF THE MOORMAN SYNCLINE AREA OF WESTERN KENTUCKY
Robert C. Shumaker Jul. 1982 75 p refs Prepared in cooperation with Michigan Univ., Ann Arbor
(Contract DE-AC21-81MC-16463)
(DE82-022305; DOE/MC-16463/T5; Rept-019277-A) Avail: NTIS HC A04/MF A01

The structural development of the Moorman syncline through time is traced. A background for a remote sensing study of that

area from LANDSAT images is sought. Topics covered include the geologic history of the area and a structural analysis of five major fault zones: the southern Illinois rift, the Wabash fault zone, faults of the Mississippi embayment, the Rough Creek fault zone, and faults of the southern shelf. The importance of Precambrian structural trends and Cambrian rift zones in the basement is emphasized. Surface structures are illustrated from published maps and sections, which show a variety of styles from simple extentional normal faults to complex shear zones associated with wrench fault tectonics. Growth movement throughout the Palezoic is an important aspect of the structural development of the area, but the surface structures primarily result from intense deformation during a late Paleozoic deformation and subsequent Mesozoic deformation that emanated from the Mississippi embayment. The distribution of reported earthquakes indicates that the crust within the area is still active. DOE

N83-25259# California Univ., Livermore. Lawrence Livermore Lab.
STUDIES OF EARTH STRESS AND ROCK PROPERTIES AND THE HYDRAULIC-FRACTURING PROCESS
Merle Hanson and Donald Towse 14 Apr. 1982 16 p refs Presented at the Workshop on Hydraulic Fracturing Stress Measurements, Monterey, Calif., 2-5 Dec. 1981 Submitted for publication
(Contract W-7405-eng-48)
(DE82-016779; UCRL-87525; CONF-811240-2) Avail: NTIS HC A02/MF A01

The mechanics of hydraulic fracturing for enlarged gas recovery and the use of a minifrac technique for stress measurements at coal mines in the Appalachian and Rocky Mountain regions are discussed. These will be used to help design fracturing techniques to recover gas from gassy coal beds. Research to date indicates that fracture propagation is strongly influenced by existing stresses and that the stress gradient in a non-uniform stress field may stop or turn the fracture. Field evidence and analyses show that anisotropic rock properties due to rock fabric are a major factor in fracture geometry and calculated stress values. DOE

N83-25260# Oak Ridge National Lab., Tenn. Computer Sciences Dept.
VALIDATION OF THE ATMOSPHERIC TRANSPORT MODEL: COMPARISON OF OBSERVED KRYPTON-85 CONCENTRATIONS WITH THOSE COMPUTED USING A GAUSSIAN PLUME MODEL
Richard J. Raridon and Brian D. Murphy 1982 16 p refs Presented at the Summer Computer Simulation Conf., Denver, 19 Jul. 1982
(Contract W-7405-eng-26)
(DE82-018163; CONF-820729-2) Avail: NTIS HC A02/MF A01

Thirty monthly average 85Kr concentrations measured at 13 sampling locations between 25 and 150 km from a quasicontinuous point source were used in a validation study of the Atmospheric Transport Model for Toxic Substances (ATM-TOX). Although the computed values tended to overestimate, more than 60% of them fell within a factor of 2 of the observed concentrations. DOE

N83-25261# Utah Univ., Salt Lake City. Research Inst.
LITHOLOGIC INTERPRETATION OF THE DE BRAGA NO. 2 AND RICHARD WEISHAUPT NO. 1 GEOTHERMAL WELLS, STILLWATER PROJECT, CHURCHILL COUNTY, NEVADA
B. S. Sibbett and R. E. Blackett Feb. 1982 38 p refs
(Contract DE-AC07-79ID-12079)
(DE82-019935; DOE/ID-12079/57; ESL-70) Avail: NTIS HC A03/MF A01

Lithologies penetrated throughout the upper 732 to 838 m within the Stillwater prospect area are terrigenous sediments of Pleistocene to Recent age. A sill of dacite to andesite composition with a thickness variable between 122 to 208 (400 to 680 ft) is present below the terrigenous sediments. Between the base of the sill and the top of the Bunejug Formation are intercalated volcanic and sedimentary rocks. All formations overlying the Bunejug Formation are probably of Pleistocene age. The basalt and basaltic andesite flows and ash below the depth of approximately 1128 m are herein assigned to the Bunejug Formation of Pliocene and possibly early Pleistocene age. The Bunejug Formation is a thick sequence of basalt to andesite flows and hyaloclastite exposed in the mountains surrounding the south half of the Carson Desert. The De Braga No. 2 well bottomed in Bunejug volcanics at a depth of 2109 m. The Richard Weishaupt No. 1 well penetrated the entire Bunejug sequence and entered felsic volcanics and tuffaceous sediments, which possibly represent part of the Truckee Formation, at a depth of approximately 2412 m. DOE

N83-25262# Los Alamos Scientific Lab., N. Mex.
INDUCED FRACTURES: WELL STIMULATION THROUGH FRACTURING
R. J. Hanold 1982 11 p refs Presented at 3d AAPG Circum-Pacific Energy and Materials Conf., Honolulu, Hawaii, 22 Aug. 1982
(Contract W-7405-eng-36)
(DE82-019554; LA-UR-82-1971; CONF-820834-2) Avail: NTIS HC A02/MF A01

Seven fracture stimulation treatments were planned and executed. It is shown that geothermal well simulation offers a technical alternative to additional well drilling and redrilling for productivity enhancement which can substantially reduce development costs. Well stimulation treatments were performed. Six of the seven stimulation experiments were technically successful in stimulating the wells. The two fracture treatments in East Mesa more than doubled the production rate of the previously marginal producer. The two fracture treatments at Raft River and the two at Baca were all successful in obtaining significant production from previously nonproductive intervals. DOE

N83-25263# Utah Univ., Salt Lake City. Dept. of Geology and Geophysics.
WEIGHTED LEAST-SQUARES ESTIMATES OF THE MAGNETOTELLURIC TRANSFER FUNCTIONS FROM NONSTATIONARY DATA
John A. Stodt Nov. 1982 37 p refs
(Contract DE-AC07-79ID-12079)
(DE83-004036; DOE/ID-12079/86) Avail: NTIS HC A03/MF A01

Magnetotelluric field measurements which are viewed as sums of signal and additive random noise components are discussed. The standard unweighted least squares estimates of the impedance and tipper functions which are calculated from noisy data are not optimal when the measured fields are nonstationary. The nonstationary behavior of the signals and noises should be exploited by weighting the data appropriately to reduce errors in the estimates of the impedances and tippers. Insight into the effects of noise on the estimates is gained by careful development of a statistical model, within a linear system framework, which allows for nonstationary behavior of both the signal and noise components of the measured field. The signal components are, by definition, linearly related to each other by the impedance and tipper functions. It is therefore appropriate to treat them as deterministic parameters, rather than as random variables, when analyzing the effects of noise on the calculated impedances and tippers. Weighted least squares procedures are developed to reduce the errors in impedances and tippers which are calculated from nonstationary data. DOE

N83-25264# Oak Ridge National Lab., Tenn. Environmental Science Div.
TRACER THEORY WITH APPLICATIONS IN GEOSCIENCES, PUBLICATION 1964
Aharon Nir and Bernadette L. Kirk Nov. 1982 96 p refs
(Contract W-7405-eng-26)
(DE83-004174; ORNL-5695-Pt-1) Avail: NTIS HC A05/MF A01

The theory of tracer use with specific applications to geosciences is presented in two parts, dealing with systems in the steady and non-steady states, respectively. Part I, presented here, introduces the general concepts of definitions of ideal tracer,

common to many disciplines e.g., life scienes, chemical engineering and environmental studies. While generally tracer literature emphasized systems composed of mixed compartments and steady state mass flow, this presentation considers both as singular cases in a non-steady state continuous mass flow system. Specific concepts of tracer theory introduced in Part I are: system response functions h/sup m/(tau) for bulk matter, and h/sup c/(tau) for tracer, 3 parallel time scales: chronological, transit time and age, with separate mass distributions with respect to transit time and age. Part I has five chapters: chapters 1 and 2 introduce the general concepts in a heuristic manner. Chapter 3 introduces two elementary mathematical and statistical tools. Chapter 4 presents the formal statements of tracer theory in the steady state while chapter 5 provides examples of applications. DOE

N83-24922# Geological Survey, Washington, D. C.
GEOLOGICAL STUDIES OF THE COST NOS. G-1 AND G-2 WELLS, UNITED STATES NORTH ATLANTIC OUTER CONTINENTAL SHELF: INTRODUCTION
Peter A. Scholle, ed. and Chiye R. Wenkam, ed. *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 1-3 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24923# Geological Survey, Washington, D. C.
GEOLOGIC SETTING OF THE GEORGES BANK BASIN
John S. Schlee and Kim D. Klitgord *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 4-10 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24924# Geological Survey, Washington, D. C.
LITHOLOGY AND PETROGRAPHY OF THE COST NOS. G-1 AND G-2 WELLS
Michael A. Arthur *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 11-33 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24925# Geological Survey, Washington, D. C.
CALCAREOUS NANNOFOSSIL BIOSTRATIGRAPHY AND PALEOENVIRONMENT OF THE COST NOS. G-1 AND G-2 WELLS IN THE GEORGES BANK BASIN
Page C. Valentine *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 34-42 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24926# Geological Survey, Washington, D. C.
FORAMINIFERAL AND SEISMIC STRATIGRAPHY, PALEOENVIRONMENTS AND DEPOSITIONAL CYCLES IN THE GEORGES BANK BASIN
C. Wylie Poag *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 43-92 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24927# Geological Survey, Washington, D. C.
SIGNIFICANCE OF THE MESOZOIC CARBONATE BANK-REEF SEQUENCE FOR THE PETROLEUM GEOLOGY OF THE GEORGES BANK BASIN
Robert E. Mattick *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 93-104 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24928# Geological Survey, Washington, D. C.
ORGANIC GEOCHEMISTRY OF THE GEORGES BANK BASIN COST NOS. G-1 AND G-2 WELLS
R. E. Miller, H. E. Lerch, G. E. Claypool, M. A. Smith, D. K. Owings, D. T. Ligon, and S. B. Eisner *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 105-142 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24930# Geological Survey, Washington, D. C.
GEOPHYSICAL STUDIES OF THE COST NOS. G-1 AND G-2 WELLS
David J. Taylor and R. C. Anderson *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 153-159 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24931# Geological Survey, Washington, D. C.
BASEMENT STRUCTURE, SEDIMENTATION AND TECTONIC HISTORY OF THE GEORGES BANK BASIN
Kim D. Klitgord, John S. Schlee, and Karl Hinz *In its* Geol. Studies of the COST Nos. G-1 and G-2 Wells, U.S. North Atlantic Outer Continental Shelf 1982 p 160-186 (For primary document see N83-24921 14-42)
Avail: NTIS HC A09/MF A01

N83-24940# California Univ., Berkeley. Lawrence Berkeley Lab.
POROUS MEDIA EQUIVALENT FOR A NETWORK OF DISCONTINUOUS FRACTURES
J. C. S. Long *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 24-27 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24941# California Univ., Berkeley. Lawrence Berkeley Lab.
DETERMINING SIZE AND INTERCONNECTION OF FRACTURES FROM CONSTANT-HEAD WELL TESTS
T. Doe and H. Endo *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 28-31 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24942# California Univ., Berkeley. Lawrence Berkeley Lab.
DEVELOPMENT OF A COUPLED THERMAL-HYDRAULIC-MECHANICAL FINITE-ELEMENT MODEL FOR SATURATED FRACTURED POROUS MEDIA
J. Noorishad, J. S. Y. Wang, C. F. Tsang, and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 31-34 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24948# California Univ., Berkeley. Lawrence Berkeley Lab.
INVESTIGATION OF SILICATE SURFACE CHEMISTRY AND REACTION MECHANISMS ASSOCIATED WITH MASS TRANSPORT IN GEOLOGIC MEDIA
A. F. White and D. L. Perry *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 50-52 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24951# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMOMECHANICAL PROPERTIES OF STRIPA GRANITE
L. Myer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 58-61 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24952# California Univ., Berkeley. Lawrence Berkeley Lab.
ANALYSIS OF TEMPERATURE DATA FROM THE FULL-SCALE HEATER EXPERIMENTS AT STRIPA
I. Javandel and P. A. Witherspoon *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 61-64 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24953# California Univ., Berkeley. Lawrence Berkeley Lab.
ROD-TYPE EXTENSOMETERS IN LONG-TERM ELEVATED

TEMPERATURE SERVICE
A. O. DuBois, P. H. Nelson, M. Hood, and E. Binnall *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 65-68 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24954# California Univ., Berkeley. Lawrence Berkeley Lab.
DETERMINATION OF THE STATE OF STRESS AT THE STRIPA MINE, SWEDEN
T. Doe *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 69-71 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24955# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOPHYSICAL BOREHOLE MEASUREMENTS IN LOW-PERMEABILITY ROCK
P. H. Nelson and R. Rachiele *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 72-75 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24956# California Univ., Berkeley. Lawrence Berkeley Lab.
DEVELOPMENT, VERIFICATION, AND APPLICATION OF MODELING TECHNIQUES FOR THERMOMECHANICAL ANALYSIS
T. Chan and E. L. Wilson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 75-78 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24957# California Univ., Berkeley. Lawrence Berkeley Lab.
MEASUREMENT OF LOW RATES OF WATER INFLOW BY MONITORED EVAPORATION IN THE LARGE-SCALE PERMEABILITY EXPERIMENT AT STRIPA
M. J. McPherson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 79-82 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24958# California Univ., Berkeley. Lawrence Berkeley Lab.
ELECTROMAGNETIC MODELING USING A FAST NUMERICAL SOMMERFELD INTEGRAL
K. H. Lee and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 85-86 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24959# California Univ., Berkeley. Lawrence Berkeley Lab.
AN INFERRED CONDUCTIVITY DISTRIBUTION IN THE VICINITY OF MOUNT HOOD, OREGON, BASED ON THE INTERPRETATION OF MAGNETOTELLURIC AND TELLURIC DATA
E. C. Mozley and N. E. Goldstein *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 86-88 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24960# California Univ., Berkeley. Lawrence Berkeley Lab.
IN-FIELD PROCESSING AND MAGNETOTELLURICS WITH THE EM-60 ELECTROMAGNETIC SYSTEM
M. Wilt, N. E. Goldstein, J. R. Haught, V. Labson, and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 88-90 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24961# California Univ., Berkeley. Lawrence Berkeley Lab.
DEEP ELECTROMAGNETIC SOUNDING IN THE BASIN AND RANGE PROVINCE
M. Wilt, N. E. Goldstein, J. R. Haught, and H. F. Morrison *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 90-91 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24962# California Univ., Berkeley. Lawrence Berkeley Lab.
SIMPLE ONE-DIMENSIONAL INVERSIONS OF MAGNETOTELLURIC DATA
W. M. Goubau *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 92-95 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24963# California Univ., Berkeley. Lawrence Berkeley Lab.
THE APPLICATION OF ASP: AN AUTOMATED SEISMIC PROCESSOR
E. L. Majer and T. V. McEvilly *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 95-98 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24964# California Univ., Berkeley. Lawrence Berkeley Lab.
ADVANCES IN TRANSIENT WELL-TESTING METHODOLOGY
C. W. Miller, S. M. Benson, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 99-102 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24965# California Univ., Berkeley. Lawrence Berkeley Lab.
LOW- TO MODERATE-TEMPERATURE HYDROTHERMAL RESERVOIR ENGINEERING RESEARCH
S. M. Benson, R. Solbau, and G. S. Bodvarsson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 102-104 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24971# California Univ., Berkeley. Lawrence Berkeley Lab.
SUBSIDENCE MODELING OF THE PLEASANT BAYOU GEOTHERMAL GEOPRESSURED REGION
K. P. Goyal, T. N. Narasimhan, and S. P. VonderHaar *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 118-121 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24972# California Univ., Berkeley. Lawrence Berkeley Lab.
FLUID SAMPLING AND ANALYSIS OF GEOPRESSURED BRINE
L. Hansen, R. M. Galbraith, O. Weres, M. C. Michel, and D. Sverjensky *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 122-124 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24978# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOLOGIC MODEL OF THE CERRO PRIETO GEOTHERMAL FIELD
S. E. Halfman, J. H. Howard, and S. P. VonderHaar *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 138-141 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24979# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOPHYSICAL MONITORING AT THE CERRO PRIETO GEOTHERMAL FIELD
M. Wilt, R. Zelwer, and E. L. Majer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 141-144 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24980# California Univ., Berkeley. Lawrence Berkeley Lab.
RESERVOIR ENGINEERING STUDIES OF THE CERRO PRIETO GEOTHERMAL FIELD
K. P. Goyal, M. J. Lippmann, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir

Eng., Geosci. Sep. 1982 p 144-147 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24981# California Univ., Berkeley. Lawrence Berkeley Lab.
THE BEHAVIOR OF ROCK-FLUID SYSTEMS AT ELEVATED TEMPERATURES AND PRESSURES
W. H. Somerton *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 151-152 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24988# California Univ., Berkeley. Lawrence Berkeley Lab.
THE PARTITIONING OF HYDROGEN SULFIDE IN THE CONDENSERS OF GEYSERS UNIT 15
O. Weres *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 168-170 refs Sponsored in part by the Pacific Gas and Electric Co. (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24989# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOANALYTICAL AND CHEMICAL BONDING STUDIES USING MODERN SURFACE TECHNIQUES
D. L. Perry *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 171-172 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24991# California Univ., Berkeley. Lawrence Berkeley Lab.
THE MEASUREMENT OF IN SITU STRESS USING NQR/NMR
E. Schempp, J. B. Murdoch, and S. M. Klainer *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 177-180 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-25265*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SUMMARY PROCEEDINGS OF A WIND SHEAR WORKSHOP
John H. Enders (Flight Safety Foundation, Arlington, Va.), William W. Melvin (Air Line Pilots Assoc., Denison, Tex.), Walter Frost (Tennessee Univ. Space Inst., Tullahoma, Tenn.), and Dennis W. Camp Apr. 1983 20 p Workshop Held at Tennessee Univ. Space Inst., Tullahoma, Tenn., 25 Oct. 1982
(NASA-CP-2270; NAS 1.55:2270) Avail: NTIS HC A02/MF A01 CSCL 04B

A number of recent program results and current issues were addressed: the data collection phase of the highly successful Joint Airport Weather Study (JAWS) Project and the NASA-B5f7B Gust Gradient Program, the use of these data for flight crew training through educational programs (e.g., films) and with manned flight training simulators, methods for post-accident determination of wind conditions from flight data recorders, the microburst wind shear phenomenon which was positively measured and described the ring vortex as a possible generating mechanism, the optimum flight procedure for use during an unexpected wind shear encounter, evaluation of the low-level wind shear alert system (LLWSAS), and assessment of the demonstrated and viable application of Doppler radar as an operational wind shear warning and detection system. Author

N83-25266*# Texas A&M Univ., College Station.
AVE/VAS 4: 25-MB SOUNDING DATA Interim Report
Meta E. Sienkiewicz Mar. 1983 334 p ref 2 Vol.
(Contract NAS8-34133)
(NASA-CR-170739; NAS 1.26:170739) Avail: NTIS HC A15/MF A01 CSCL 04B

The rawinsonde sounding program is described and tabulated data at 25 mb intervals for the 24 stations and 14 special stations participating in the experiment is presented. Sounding were taken at 3 hr intervals. An additional sounding was taken at the normal synoptic observation time. Some soundings were computed from raw ordinate data, while others were interpolated from significant level data. S.L.

N83-25267*# Texas A&M Univ., College Station.
AVE/VAS 5: 25-mb SOUNDING DATA Interim Report
Meta E. Sienkiewicz Mar. 1983 326 p ref 2 Vol.
(Contract NAS8-34133)
(NASA-CR-170740; NAS 1.26:170740) Avail: NTIS HC A15/MF A01 CSCL 04B

The rawinsonde sounding program is described and tabulated data at 25 mb intervals for the 24 and 14 special stations participation in the experiment are presented. Soundings were taken at 3 hr intervals. The method of processing soundings is discussed briefly, estimates of the RMS errors in the data are presented, and an example of contact data is given. Termination pressures of soundings taken in the meso beta scale network are tabulated, as are observations of ground temperature at a depth of 2 cm. S.L.

N83-25268*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
SIGNIFICANT EVENTS IN LOW-LEVEL FLOW CONDITIONS HAZARDOUS TO AIRCRAFT
Margaret B. Alexander and Dennis W. Camp Jan. 1983 39 p refs
(NASA-TM-82522; NAS 1.15:82522) Avail: NTIS HC A03/MF A01 CSCL 04B

Atmospheric parameters recorded during high surface winds are analyzed to determine magnitude, frequency, duration, and simultaneity of occurrence of low level flow conditions known to be hazardous to the ascent and descent of conventional aircraft and the space shuttle. Graphic and tabular presentations of mean and extreme values and simultaneous occurrences of turbulence (gustiness and a gust factor), wind shear (speed and direction), and vertical motion (updrafts and downdrafts), along with associated temperature inversions are included as function of tower height, layer and/or distance for six 5 sec intervals (one interval every 100 sec) of parameters sampled simultaneously at the rate of 10 speeds, directions and temperatures per second during an approximately 10 min period. S.L.

N83-25269*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRECIPITATION MEASUREMENTS FROM SPACE: WORKSHOP REPORT. AN ELEMENT OF THE CLIMATE OBSERVING SYSTEM STUDY
David Atlas, ed. and Otto W. Thiele, ed. Oct. 1981 446 p refs Workshop held in Greenbelt, Md., 28 Apr. - 1 May 1981
(NASA-TM-85329; NAS 1.15:85329) Avail: NTIS HC A19/MF A01 CSCL 04B

Global climate, agricultural uses for precipitation information, hydrological uses for precipitation, severe thunderstorms and local weather, global weather are addressed. Ground truth measurement, visible and infrared techniques, microwave radiometry and hybrid precipitation measurements, and spaceborne radar are discussed. For individual titles, see N83-25270 through N83-25316.

N83-25270*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SUMMARY OF REQUIREMENTS AND RECOMMENDATIONS
Dudley G. McConnell, Paul H. Hwang, Otto W. Thiele, Eugene M. Rasmusson, Yale Mintz, Norton D. Strommen, Robert F. Dale, Richard K. Farnsworth, Robert F. Adler, and John H. E. Clark *In its* Precipitation Meas. from Space: Oct. 1981 12 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Global climate, agricultural uses for precipitation information, hydrological uses for precipitation information, severe thunder-

storms and local weather, and global weather are discussed.
Author

N83-25271*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SAMPLING PROBLEMS
John A. Flueck, Robert F. Crane, Charles R. Laughlin, Thomas L. Bell, Jose G. Meiten, Eberhard Ruprecht, David R. Short, John S. Theon, and John L. Vogel *In its* Precipitation Meas. from Space: Oct. 1981 5 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Precipitation estimates from satellites are subject to a number of uncertainties involving design characteristics, satellite positioning, natural variability of precipitation, and the noncontinuous acquisition of data. The sources and sizes of these uncertainties are in need of proper evaluation and estimation. The present sampling and estima-theory seems to be adequate for some measurement problems (e.g., determining precipitation at a point), while others require further theoretical work (e.g., determining the time history of precipitation over large areas). Author

N83-25272*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GROUND-TRUTH MEASUREMENT SYSTEMS
Robert Serafin, Thomas A. Seliga, Roger M. Lhermitte, Jeffrey A. Nystuen, Steve Cherry, V. N. Bringi, Roy Blackmer, and Gerald M. Heymsfield *In its* Precipitation Meas. from Space: Oct. 1981 5 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Ground-truth measurements of precipitation and related weather events are an essential component of any satellite system designed for monitoring rainfall from space. Such measurements are required for testing, evaluation, and operations; they provide detailed information on the actual weather events, which can then be compared with satellite observations intended to provide both quantitative and qualitative information about them. Also, very comprehensive ground-truth observations should lead to a better understanding of precipitation fields and their relationships to satellite data. This process serves two very important functions: (a) aiding in the development and interpretation of schemes of analyzing satellite data, and (b) providing a continuing method for verifying satellite measurements. Author

N83-25273*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
VISIBLE AND INFRARED TECHNIQUES
David W. Martin, Roderick A. Scofield, Robert F. Adler, Eric C. Barrett, Cecilia G. Griffith, Earl S. Merritt, Andrew J. Negri, Colin S. Ramage, and Donald P. Wylie *In its* Precipitation Meas. from Space: Oct. 1981 10 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Time-dependent indexing schemes and time-dependent life-history techniques are discussed. Author

N83-25274*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MICROWAVE RADIOMETRY AND HYBRID PRECIPITATION MEASUREMENTS
Thomas T. Wilheit, James R. Greaves, Edward B. Rodgers, William R. Bandeen, Bernard C. Diesen, III, Hsaio-Hua K. Burke, Stanley O. Kidder, Shaun Lovejoy, Eberhard Ruprecht, Richard C. Savage et al *In its* Precipitation Meas. from Space: Oct. 1981 11 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

It was necessary to identify the most promising measurement techniques and strategies and to understand those candidate systems in detail. The emphasis was on passive microwave remote-sensing techniques. A brief background in passive microwave and hybrid techniques for measuring precipitation, key problem areas and strategies for dealing with those problems, a precipitation measurement system, and specific recommendations are presented. Author

N83-25275*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPACEBORNE RADAR
Richard K. Moore, Jerome Eckerman, Robert Meneghini, David Atlas, Wolfgang M. Boerner, Steve Cherry, John F. Clark, Richard J. Doviak, Julius Goldhirsh, Roger M. Lhermitte et al *In its* Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The spaceborne radar panel considered how radar could be used to measure precipitation from satellites. The emphasis was on how radar could be used with radiometry (at microwave, visible (VIS), and infrared (IR) wavelengths) to reduce the uncertainties of measuring precipitation with radiometry alone. In addition, the fundamental electromagnetic interactions involved in the measurements were discussed to determine the key work areas for research and development to produce effective instruments. Various approaches to implementing radar systems on satellites were considered for both shared and dedicated instruments. Finally, a research and development strategy was proposed for establishing the parametric relations and retrieval algorithms required for extracting precipitation information from the radar and associated radiometric data. Author

N83-25276*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A BRIEF REVIEW OF THE PRESENT STATUS OF GLOBAL PRECIPITATION ESTIMATES
Yale Mintz (Maryland Univ.) *In its* Precipitation Meas. from Space: Oct. 1981 4 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The global distribution of precipitation, both the normal distribution (i.e., the precipitation averaged over a number of years) and time-series of the precipitation are reviewed. Only the most recent studies are explicitly covered. Author

N83-25277*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRECIPITATION MEASUREMENT REQUIREMENTS FOR GENERAL CIRCULATION CLIMATE MODEL DEVELOPMENT AND APPLICATIONS
Yale Mintz (Maryland Univ.) *In its* Precipitation Meas. from Space: Oct. 1981 5 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Global scale diagnostics, regional diagnostics, and satellite IR data are discussed. Author

N83-25278*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md. Climate Analysis Center.
PRECIPITATION DATA FOR CLIMATE DIAGNOSTICS
Eugene M. Rasmusson and Phillip A. Arkin *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 9 p ref (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A spatial resolution from satellite-derived data of 250 km by 250 km with a time of from 2 to 4 weeks is discussed. Author

N83-25279*# Purdue Univ., Lafayette, Ind.
AGRICULTURAL REQUIREMENTS FOR PRECIPITATION MEASUREMENTS
Norton D. Strommen (USDA), Robert F. Dale, and Raymond P. Motha *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 4 p refs Presented at the Workshop on Existing Meteorological Networks, Anaheim, Calif., 30-31 Mar. 1981 (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The requirements for precipitation measurements from space for hydrologic forecasting applications are discussed. The structure of the hydrologic forecasting service of the National Weather Service (NWS) is described, and an attempt is made to estimate the sampling and accuracy requirements for a range of spatial and temporal averaging scales corresponding to various NWS

hydrologic applications. Finally, the data base requirements are addressed. The critical point is made that for the data source to be most useful operationally at the NWS River Forecast Centers, the data must be available on-line in a format compatible with computer processing. Several data base systems are illustrated in a scenario for a multi-sensor rainfall analysis system (MSRANS). Actually, MSRANS is the software existing within the various computer environments required to preprocess, process, and analyze rainfall information from multiple sources. Author

N83-25280*# National Weather Service, Silver Spring, Md. Hydrologic Research Lab.
HYDROLOGIC FORECASTING REQUIREMENTS FOR PRECIPITATION DATA FROM SPACE MEASUREMENTS
Michael D. Hudlow, Richard K. Farnsworth, and Douglas R. Green *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 8 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The needs for precipitation information in severe storms research and in the operational detection and forecasting of such phenomena are described. The discussion will include thunderstorms, tropical cyclones, and regional and mesoscale numerical models used to analyze and forecast these and other regional scale phenomena. Author

N83-25281*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SEVERE STORMS REQUIREMENTS FOR PRECIPITATION INFORMATION
Robert F. Adler *In its* Precipitation Meas. from Space: Oct. 1981 4 p (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Moisture can play an important if not dominant role in supplying energy to tropical and extra-tropical weather systems. In the tropics where the air is almost saturated only the slightest amount of uplift is required to initiate the release of vast amounts of latent heat to fuel systems as diverse as convective cloud clusters and hurricanes. The role of latent heating on extra-tropical systems is much more subtle. While the primary energy source for synoptic-scale systems is often the release of gravitational potential energy through the sinking of cold air and the rising of warm, it seems that the latent heat that is eventually realized through slow uplift of large masses of air can significantly modify the evolution of the system. An analysis of the energetics of the storm of March 25 to 27, 1978 over the eastern USA to understand the implications of the heat released due to the vast cloudy area associated with warm frontal overrunning was performed. Author

N83-25282*# Pennsylvania State Univ., University Park.
GLOBAL WEATHER REQUIREMENTS FOR PRECIPITATION MEASUREMENTS
John H. E. Clark *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 6 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Results of a radar study of summertime convection in the high plains of Kansas are presented which demonstrate the importance of the small scale structure of precipitation to the overall production of precipitation in a storm. The smaller scale structure must be modeled to develop valid relationships between satellite observables and precipitation amount. The Kansas results suggest that just the observation of the number and spacings of the active regions of convection (thunderstorms) is sufficient to provide an estimate of water flux with an uncertainty of less than a factor of two. Author

N83-25283*# Dartmouth Coll., Hanover, N.H. School of Engineering.
SAMPLING PROBLEMS: THE SMALL SCALE STRUCTURE OF PRECIPITATION
R. K. Crane *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The quantitative measurement of precipitation characteristics for any area on the surface of the Earth is not an easy task. Precipitation is rather variable in both space and time, and the distribution of surface rainfall data given location typically is substantially skewed. There are a number of precipitation process at work in the atmosphere, and few of them are well understood. The formal theory on sampling and estimating precipitation appears considerably deficient. Little systematic attention is given to nonsampling errors that always arise in utilizing any measurement system. Although the precipitation measurement problem is an old one, it continues to be one that is in need of systematic and careful attention. A brief history of the presently competing measurement technologies should aid us in understanding the problem inherent in this measurement task. Author

N83-25284*# Temple Univ., Philadelphia, Pa. Dept. of Statistics.
SOME STATISTICAL PROBLEMS INHERENT IN MEASURING PRECIPITATION
John A. Flueck *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 8 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A formula permitting calculation of the mean-square error of the mean value of a random variable due to periodic sampling is derived and applied to estimating the sampling error for satellite observation of the mean rainfall during the GARP Atlantic Tropical Experiment (GATE). The effects of both spatial resolution and frequency of observation on the sampling error are summarized in graphs. It is found that four observations per day are sufficient to determine the monthly mean rainfall over an area of 2.5 deg square (280km x 280km) to within a standard deviation of 5 percent of its mean value; two samples per day would yield an error with a standard deviation slightly less than 10 percent of the mean. A satellite instrument with less frequent sampling may produce significantly greater error in the estimate of monthly mean rainfall. Author

N83-25285*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ON THE EFFECT OF TEMPORAL SAMPLING ON THE OBSERVATION OF MEAN RAINFALL
Charles R. Laughlin *In its* Precipitation Meas. from Space: Oct. 1981 8 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Rainfall characteristics using data from dense recording raingage networks is reviewed. Data from such networks have quantified temporal and spatial rainfall distributions, and have supplied specialized information about local and orographic effects. The natural variability, temporally and spatially, for annual, seasonal, monthly, and individual events is treated. Especially important are the spatial variations of precipitation as a function of synoptic type, precipitation type, amount, and duration. Results from dense raingage networks in Illinois, and some data from other climatic regions is also treated. Author

N83-25286*# Illinois State Water Survey, Champaign.
RAINGAGE NETWORK SAMPLING STATISTICS
John L. Vogel *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 17 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Sampling problems raise large difficulties for the precipitation measurements from space. In the tropics rainfall processes are organized in scales which are hardly resolved by the microwave radiometers on board of satellites. Even in the cloud clusters, which mark significant, large extended signals in the visible and infrared images, the precipitation areas cover only a small region. Our analysis of the cloud clusters over the W Pacific Ocean revealed that more than 50% of the area of a typical Western Pacific cluster are without rain. The radar observations during GATE

generally confirmed those results. The rainfall was calculated from Nimbus V microwave data at 19.35 GHz and the results were compared with the GATE radar rainfall. The results are improved if the rain areas within the field of view are determined by additional observations and lead to a correction of the microwave brightness temperature. Author

N83-25287*# Cologne Univ. (West Germany). Inst. fuer Geophysik und Meteorologie.

MICROWAVE RADIOMETRY SAMPLING PROBLEMS DEMONSTRATED WITH NIMBUS 5 RAIN RATES VERSUS GATE DATA

E. Raschke and E. Ruprecht *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 10 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

The performance of rain estimation techniques is analyzed. The results from the Griffith/Woodley satellite rain estimation technique are tested. Results, although preliminary, allow objective determination of the feasibility of the use of satellite rain estimates at various scales of interest. Author

N83-25288*# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.

A STANDARD VERIFICATION FOR RAINFALL ESTIMATION FROM REMOTE PLATFORMS

Jose G. Meitin (Cooperative Inst. for Research in Environmental Sciences), Cecilia G. Griffith, John A. Augustine, and William L. Woodley *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 4 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

Measurements of reflectivity at horizontal (Zh) and vertical (Zy) polarizations provide adequate information necessary to infer the two parameters of an exponential raindrop size distribution (No, Do) where the distribution is given by N(D) = Noexp(-3.67 D/Do). This distribution enables computation of water content or still air rainfall rates. The physical basis of the radar technique is outlined and illustrated theoretically, and experimental results, comparing radar derived rainfall rates with raingage and disdrometer measurements, are reviewed. The technique is useful for many meteorological and hydrological purposes, including ground truth measurements of rainfall rate over the ocean for comparison with satellite related observations. E.A.K.

N83-25289*# Ohio State Univ., Columbus. Dept. of Electrical Engineering.

THE DIFFERENTIAL REFLECTIVITY DUAL POLARIZATION METHOD OF RAINFALL MEASUREMENTS

Thomas A. Seliga and V. N. Bringi *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 7 p refs (For primary document see N83-25269 14-47)

(Grants NSF ATM-79-08666; NSF ATM-80-03376; NATO-RG-054.80)

Avail: NTIS HC A19/MF A01 CSCL 04B

Several methods used to estimate rainfall rate-R were surveyed. The distribution N(D) of dropsizes is of central importance in determining the reflectivity factor-Z, attenuation rate-K, and R. With single parameter measurement techniques either of the remotely sensed parameters Z or K can be used to estimate R when gross assumptions on N(D) can be made. If N(D) can be described by a two parameter distribution, dual measurement techniques can better estimate R without invoking these coarse assumptions. Three techniques whereby two variables might be measured are reviewed: (1) dual wavelength in which Z and K are remotely measured; (2) dual polarization in which reflectivity is measured with two orthogonal polarizations; and (3) rain gage-radar combinations whereby in situ point measurements of R and radar measurement of Z or R are combined to obtain a better assessment of rain over areas between gages. E.A.K.

N83-25290*# National Severe Storms Lab., Norman, Okla.

A SURVEY OF RADAR RAIN MEASUREMENT TECHNIQUES

R. J. Doviak *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 16 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

Oceanic rainfall was extrapolated in the past from land and island measurements. It was uncertain how representative the land measurements were in local and remote oceanic areas. Now several independent oceanic rainfall analyses are available. These analyses are based upon different techniques, yet they produce similar values. It is suggested that island and coastal measurements are suitable to calibrate satellite oceanic rainfall measurements. E.A.K.

N83-25291*# San Diego State Univ., Calif. Dept. of Geological Sciences.

GROUND TRUTH FOR OCEANIC RAINFALL

Clive E. Dorman *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 7 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

Communications systems operating at frequencies in excess of 10 GHz are degraded significantly by rainfall. To provide the information needed for design of these millimeter wave systems, rain attentuation models were developed and data bases of propagation related information were accumulated. These data bases were developed based on the signal level measurements of geostationary satellite beacons at selected frequencies. Groundbased radar reflection measurements were able to develop data bases for system design. The rain attenuation models allow accurate correlation between the rain rate and the attenuation. E.A.K.

N83-25292*# National Aeronautics and Space Administration, Washington, D. C.

PRECIPITATION MEASUREMENTS FOR EARTH-SPACE COMMUNICATIONS: ACCURACY REQUIREMENTS AND GROUND-TRUTH TECHNIQUES

L. J. Ippolito and R. Kaul (ORI, Inc.) *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

Rainfall which is regarded as one of the more important observations for the measurements of this most variable parameter was made continuously, across large areas and over the sea. Ships could not provide the needed resolution nor could available radars provide the needed breadth of coverage. Microwave observations from the Nimbus-5 satellite offered some hope. Another possibility was suggested by the results of many comparisons between rainfall and the clouds seen in satellite pictures. Sequences of pictures from the first geostationary satellites were employed and a general correspondence between rain and the convective clouds visible in satellite pictures was found. It was demonstrated that the agreement was best for growing clouds. The development methods to infer GATE rainfall from geostationary satellite images are examined. E.A.K.

N83-25293*# Space Science and Engineering Center, Madison, Wis.

A LIFE HISTORY METHOD FOR ESTIMATING CONVECTIVE RAINFALL

David W. Martin *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 3 p refs (For primary document see N83-25269 14-47)

Avail: NTIS HC A19/MF A01 CSCL 04B

The remote sensing of rain amounts is of great interest for a great variety of operational applications, including hydrology, hydroelectricity and agriculture is discussed. The microwave radiometer represents the most obvious technique, however, poor spatial and temporal resolution, together with the problems associated with the estimation of effective rain layer height make visible and IR techniques more promising at the present time. Based on bivariate frequency distribution of brightness versus temperature, brightness enhancing or infrared technique alone may

be inadequate to deduce details of convective activity. It is implied that better estimates of rainfall will come from visible and IR observations combined than from either used alone. The technique identifies clouds with high probability of rain as those which have large optical and presumably physical thickness as measured by the visible albedo in comparison with their height, determined by the intensity of the IR emission. E.A.K.

N83-25294*# McGill Radar Weather Observatory, Ste. Anne de Bellevue (Quebec).
A COMBINED VISIBLE AND IR TECHNIQUE FOR THE ESTIMATION OF RAINFALL AMOUNTS FROM GOES DATA
G. L. Austin and S. Lovejoy *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 4 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The use of visible and infrared techniques for estimating precipitation for flash flood, hydrological, and agricultural applications is discussed. Satellite derived rainfall estimates supplement other data or are the only data available. The Scofield/Oliver convective rainfall technique is used for analyzing a half hour period of heavy rainfall during a Chicago flash flood event. The results of a real time hydrological application of the Scofield/Oliver technique for the Hurricane Allen event are also presented. Visible and IR techniques for agricultural applications are also discussed. E.A.K.

N83-25295*# National Oceanic and Atmospheric Administration, Washington, D. C. Applications Lab.
VISIBLE AND INFRARED TECHNIQUES FOR FLASH FLOOD, HYDROLOGICAL, AND AGRICULTURAL APPLICATIONS
Roderick A. Scofield *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 10 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A common requirement of these agriculture, climatology and hydrology fields is the accurate and timely estimation of precipitation. Yet, it is often difficult to obtain such estimates by conventional means. The advent of satellite remote sensing however has opened the possibility of making rain estimates over time and space scale never before available. A computer automated technique that estimates a summertime convective rainfall from the thermal infrared imagery of geosynchronous satellites is reviewed. E.A.K.

N83-25296*# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
THE ESTIMATION OF CONVECTIVE PRECIPITATION FROM GOES IMAGERY WITH THE GRIFFITH/WOODLEY TECHNIQUE
Cecilia G. Griffith and William L. Woodley *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 6 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Improved rainfall monitoring using satellite and conventional data are described. A method was developed to: (1) provide rainfall evaluations more uniform, accurate and complete than can be derived from satellite or conventional data alone; (2) serve current operational environmental program in countries with special needs for improved rainfall data; (3) invoke either polar orbiting and/or geostationary imagery as the satellite inputs; (4) utilize global telecommunication system (GTS) SYNOP messages as the basic conventional data inputs; (5) be applicable to any and all types of weather situations in the operational areas; (6) be undemanding in hardware and software so as to be an option available for use even by nations or agencies with very limited financial resources. E.A.K.

N83-25297*# Bristol Univ. (England).
THE BRISTOL METHOD OF SATELLITE-IMPROVED RAINFALL MONITORING
Eric C. Barrett *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 11 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Remote sensing estimates of area average precipitation are useful to agricultural and climatological applications. Estimates obtained by active or passive microwaves, infrared and visible sensors may be augmented and improved using indirect measures of precipitation, such as the change in near surface soil moisture content caused by a particular event. Measurements of soil moisture using infrared radiances do not provide precipitation information in real time since the sky must clear. However, the resultant estimate of precipitation is a time integrated value which provides a significant savings in data handling and can overcome virtually all of the sampling problems associated with the monitoring of precipitation through storms of long duration. E.A.K.

N83-25298*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
INFERENCE OF PRECIPITATION THROUGH THERMAL INFRARED MEASUREMENTS OF SOIL MOISTURE
Peter J. Wetzel and David Atlas *In its* Precipitation Meas. from Space: Oct. 1981 6 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The physics of microwave radiative transfer is well understood so that causal models can be assembled which relate the observed brightness temperatures to assumed distributions of hydrometeors (both liquid and ice), non-precipitating clouds, water vapor oxygen, and surface conditions. Present models assume a Marshall Palmer size distribution of liquid hydrometers from the surface to the freezing level (near the 0 C isotherm) and a variable thickness of frozen hydrometeors above that with various reasonable distribution of the other relevant constituents. The validity of such models is discussed. All uncertainties in the rain rate retrieval algorithms can be expressed in terms of specific model uncertainties which can be addressed through appropriate measurements. Those factors which must be known to achieve umambiguous results can be identified so that rainfall measuring algorithms can be developed and improved. The emissivity of the underlying surface significantly affects the contrast that may be measured between areas covered by rain and those which are dry. Sensing strategies for measuring rain over the ocean and rain over land are reviewed. M.G.

N83-25299*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A SURVEY OF PASSIVE MICROWAVE AND HYBRID REMOTE SENSING OF PRECIPITATION
J. A. Weinman (Wisconsin Univ.) and T. T. Wilheit *In its* Precipitation Meas. from Space: Oct. 1981 3 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

It is noted that for practical realization of new information on precipitation during this decade, satellite observing systems must be coupled into surface-based observations and computer models of weather systems as they develop. Methods to combine the satellite/surface-based/model capabilities are discussed and several precipitation estimation pilot studies are proposed and outlined. M.G.

N83-25300*# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
COMBINED SPACEBORNE AND CONVENTIONAL MEASUREMENTS FOR PRECIPITATION ESTIMATION
Thomas H. VonderHaar and Eric A. Smith *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 8 p refs (For primary document see N83-25269 14-47)
(Contract NAS5-26343)
Avail: NTIS HC A19/MF A01 CSCL 04B

In order to overcome the limitations of both IR/visible and microwave radiometer based techniques, a 'hybrid' scheme is suggested whose accuracy is investigated using radar based simulations. Such a scheme could potentially combine the high temporal resolution of the vis/IR imagery with the anticipated rain

rate estimating ability of the next generation of satelliteborne microwave radiometers. M.G.

N83-25301*# McGill Univ., Montreal (Quebec). Stormy Weather Group.
COMBINING VISIBLE AND INFRARED TECHNIQUES WITH LAMMR FOR DAILY RAINFALL ESTIMATES
Shaun Lovejoy *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A brief description of other methods of rainfall measurement at the sea surface is given. The general underwater ambient noise background of the ocean is described. The physics of noise generation by bubbles and splashes is reviewed. Monitoring underwater ambient noise levels to measure rainfall rate requires that the spectral shapes of the noise from wind and rain be different or at least distinguishable. This would allow the rain noise to be separated from the wind noise and then hopefully it can be correlated with rainfall rate. Different spectral shapes are observed experimentally. Author

N83-25302*# Scripps Institution of Oceanography, La Jolla, Calif.
USING UNDERWATER AMBIENT NOISE LEVELS TO MEASURE RAINFALL RATE: A REVIEW
Jeffrey A. Nystuen *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 33 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The use of satellite passive microwave radiometry in the determination of precipitation frequencies and areas is discussed. Precipitation detection over the ocean and land and the accuracy of results are addressed. M.G.

N83-25303*# Illinois Univ., Urbana. Lab. for Atmospheric Research.
ON THE MEASUREMENT OF PRECIPITATION FREQUENCIES BY PASSIVE MICROWAVE RADIOMETERY
Stanley Q. Kidder *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 3 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

Over most of the microwave spectrum, raindrops both absorb and scatter radiation producing large changes in brightness temperatures relative to clear or cloudy conditions. Since the structure of rain varies substantially for different rain rates and climatological backgrounds, the raindrop size distribution, the rain layer thickness and the ice clouds above the rain layer are all important inputs to the model computations. The subsequent modeling involves applying the Mie theory to derive the absorption and scattering effects and the radiative transfer calculation is based upon a variational iterative approach which takes account of the multiple scattering effect of the rain layer. Results over both ocean and land backgrounds are demonstrated. It is also demonstrated that by using discrimination tests of the radiometric data, the rain/no rain decision can be made and the rainfall rate can be retrieved from a statistical inversion technique. M.G.

N83-25304*# Environmental Research and Technology, Inc., Concord, Mass.
DETECTION OF RAINFALL RATES UTILIZING SPACEBORNE MICROWAVE RADIOMETERS
Hsiao-Hua K. Burke, Kenneth R. Hardy, and Nancy K. Tripp *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 7 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

To demonstrate the success of utilizing passive microwave sensors in monitoring synoptic scale rainfall, two studies are described in which electrically scanning microwave radiometers (ESMR-5 and 6) on board Nimbus 5 and 6 were employed using a Langrangian frame of reference. The first study suggests a method of utilizing ESMR-5 measurements to quantize rainfall over water within tropical and extratropical storms and to use these measurements to monitor and possibly predict storm intensity. The second study suggests a method of monitoring the coverage and movement of synoptic rain over land by employing ESMR-6. M.G.

N83-25305*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE UTILIZATION OF SATELLITE PASSIVE MICROWAVE SENSORS TO MONITOR SYNOPTIC SCALE RAINFALL
Edward B. Rodgers *In its* Precipitation Meas. from Space: Oct. 1981 13 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A microwave imaging sensor, built for flight on the Defense Meteorological Satellite Program spacecraft, is discussed. Major elements of the sensor development program are summarized as background for planning a data archival program useful for climate research. M.G.

N83-25306*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE DMSP IMAGER (SSMI): UNFINISHED PLANS
Richard C. Savage *In its* Precipitation Meas. from Space: Oct. 1981 7 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The basic theory relating microwave emissivity to soil and snow moisture is presented along with data from field and aircraft measurements to support the theory. Data from the ESMR on Nimbus-5 and the S-194 L Band radiometer on Skylab were compared with Antecedent Precipitation indices (APT) to show the sensitivity of spaceborne observations to soil moisture. Similarly, data from the ESMR and SMMR on the Nimbus spacecraft were compared with surface measurements of snow depth with good results. M.G.

N83-25307*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
REMOTE SENSING OF STORED PRECIPITATION, i.e., SOIL MOISTURE AND SNOW
Thomas J. Schmugge *In its* Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The characteristics and performance of spaceborne precipitation radar systems are discussed. The development of a model is discussed. Examples of simulation results are given. It was found that the accuracy of rain rate estimates is improved by using higher resolution radar. R.J.F.

N83-25308*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SPACEBORNE PRECIPITATION RADAR
J. Eckerman and R. Meneghini *In its* Precipitation Meas. from Space: Oct. 1981 16 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The performances and characteristics of a satelliteborne radar operating in the millimeter wavelength region of the spectrum with emphasis placed on the 35 and 94 GH3 frequency bands are discussed. It is concluded that millimetric wavelengths provide an acceptable solution for the design of satelliteborne active microwave equipment. R.J.F.

N83-25309*# Miami Univ., Fla.
SATELLITE BORNE DUAL MILLIMETRIC WAVE LENGTH RADAR
R. M. Lhermitte *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 7 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The failure of attempts to accurately measure precipitation by using a single quality that is used to deduce the desired precipitation parameter through a derived relationship is discussed. A number of dual measurement techniques for the accurate determination of instantaneous rainfall rates from space are proposed. It is

concluded that dual measurement techniques show high promise for measuring precipitation parameters with greater accuracy than that which was possible in the past. R.J.F.

N83-25310*# Clemson Univ., S.C. Dept. of Physics and Astronomy.
POTENTIAL OF DUAL-MEASUREMENT TECHNIQUES FOR ACCURATE DETERMINATION OF INSTANTANEOUS RAINFALL RATE FROM SPACE
Carlton W. Ulbrich *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 5 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The incorporation in the 13.5 GHz SEASAT type radar altimeter of a mode to measure rain rate is investigated. Specifically, an algorithm is developed relating the echo power at the various range bins to the rain rate, taking into consideration Mie scattering and path attenuation. The dependence of the algorithm on rain drop size distribution, and non-uniform rain structure are examined and associated uncertainties defined. A technique for obtaining drop size distribution through the measurements of power at the top of the raincell and power difference through the cell is also investigated together with an associated error analysis. A description of the minor hardware modifications to the basic SEASAT design is given for implementing the rain measurements. Author

N83-25311*# National Aeronautics and Space Administration. Wallops Flight Center, Wallops Island, Va.
RAIN RATE MEASUREMENT CAPABILITIES USING A SEASAT TYPE RADAR ALTIMETER
Julius Goldhirsh (APL) and Edward J. Walsh *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 13 p (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The combined use of a space-based radar and a radiometer for measurement of precipitation is discussed. Phenomena to exploit or overcome is surveyed. Basic measurement problems are discussed. Several active systems are proposed, including three ocean systems and two land-sea systems. Recommendations for future research are given. R.J.F.

N83-25312*# Kansas Univ. Center for Research, Inc., Lawrence. Remote Sensing Lab.
USE OF COMBINED RADAR AND RADIOMETER SYSTEMS IN SPACE FOR PRECIPITATION MEASUREMENT: SOME IDEAS
Richard K. Moore *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 25 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A brief survey is given of some fundamental physical concepts of optimal polarization characteristics of a transmission path or scatter ensemble of hydrometers. It is argued that, based on this optimization concept, definite advances in remote atmospheric sensing are to be expected. Basic properties of Kennaugh's optimal polarization theory are identified. R.J.F.

N83-25313*# Illinois Univ., Chicago. Lab. for Communications.
USE OF THE OPTIMAL POLARIZATION CONCEPT IN ELECTROMAGNETIC IMAGING OF HYDROMETEOR DISTRIBUTIONS
Wolfgang-M. Boerner *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 15 p (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A brief survey is given of some fundamental physical concepts of optimal polarization characteristics of a transmission path or scatterer ensemble of hydrometeors. It is argued that, based on this optimization concepts, definite advances in remote atmospheric sensing are to be expected. Basic properties of Kennaugh's optimal polarization theory are identified. R.J.F.

N83-25314*# Technology Service Corp., Silver Spring, Md.
BISTATIC RADAR METEOROLOGICAL SATELLITE
Fred E. Nathanson *In* NASA. Goddard Space Flight Center Precipitation Meas. from Space: Oct. 1981 15 p (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

A technique is discussed that employs a radar transmitter with a moderate size antenna placed in a geosynchronous orbit with either a 0 degree or a low inclination orbit. The reflected signals from the precipitation are then received either on a single beam from a satellite having a beamwidth of about 6 degrees or preferably with a beam that scans the U.S. in a raster pattern with about 0.9 degrees beamwdith. While it would seem that a bistatic system with the transmitter at synchronous altitude and the receivers near the surface would not be a very efficient way of designing a radar system, it is somewhat surprising that the required power and antenna sizes are not that great. Two factors make the meteorological application somewhat more attractive than the bistatic detection of point targets. First, the bistatic reflections of radar signals from precipitation are to a large extent omnidirectional, and while raindrops are spheriods rather than spheres, the relationship of the reflectivity of the rain to rainfall rate can be easily derived. The second reason is that the rain echo signal level is independent of range from a receive only radar, and if the bistatic system works at all, it will work at long ranges. R.J.F.

N83-25315*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
ADAPTIVELY POINTING SPACEBORNE RADAR FOR PRECIPITATION MEASUREMENTS
David Atlas *In its* Precipitation Meas. from Space: Oct. 1981 9 p refs Previously announced as A82-32773 (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

An auxiliary concept of adaptive pointing applicable to meteorological radar is discussed. This control technique would resolve the conflicts among speed of scan or scan width, resolution, and dwell time per resolution element. At T1(orbital position) a passive infrared radiometer imager scans a swath ahead of the spacecraft; an appropriate algorithm indicates which clouds are probably producing precipitation. These locations are then used by the on-board antenna controller to program the antenna scan so that the radar samples clouds A and B at times T2 and T3 respectively. R.J.F.

N83-25316*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE OUTLOOK FOR PRECIPITATION MEASUREMENTS FROM SPACE
David Atlas, Jerome Eckerman, and Robert Meneghini *In its* Precipitation Meas. from Space: Oct. 1981 9 p refs (For primary document see N83-25269 14-47)
Avail: NTIS HC A19/MF A01 CSCL 04B

The outlook for providing precipitation measurements of useful accuracy and or precision from space is discussed. Visible and infrared techniques, microwave radiometers, spaceborne radar, and altimeters are discussed. Key obstacles are identified. R.J.F.

N83-25317*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
EVALUATION OF THE SYNOPTIC AND MESOSCALE PREDICTIVE CAPABILITIES OF A MESOSCALE ATMOSPHERIC SIMULATION SYSTEM
Steven E. Koch, William C. Skillman, Paul J. Kocin, Peter J. Wetzel, Keith Brill (General Software Corp., Landover, Md.), Dennis A. Keyser (General Software Corp., Landover, Md.), and Michael C. McCumber (Universities Space Research Association, Columbia, Md.) Mar. 1983 117 p refs
(NASA-TM-84995) Avail: NTIS HC A06/MF A01 CSCL 04B

The overall performance characteristics of a limited area, hydrostatic, fine (52 km) mesh, primitive equation, numerical weather prediction model are determined in anticipation of satellite data assimilations with the model. The synoptic and mesoscale predictive capabilities of version 2.0 of this model, the Mesoscale Atmospheric Simulation System (MASS 2.0), were evaluated. The

two part study is based on a sample of approximately thirty 12h and 24h forecasts of atmospheric flow patterns during spring and early summer. The synoptic scale evaluation results benchmark the performance of MASS 2.0 against that of an operational, synoptic scale weather prediction model, the Limited area Fine Mesh (LFM). The large sample allows for the calculation of statistically significant measures of forecast accuracy and the determination of systematic model errors. The synoptic scale benchmark is required before unsmoothed mesoscale forecast fields can be seriously considered. S.L.

N83-25318# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
A STUDY ON THE VIABILITY OF PRECIPTATION FORECASTING IN NORTHEASTERN BRAZIL FROM 1 TO 9 MONTHS M.S. Thesis - 27 Apr. 1982 [UMESTUDO SOBRE A VIABILIDADE DE PREVER CHUVAS NO NORDESTE DO BRASIL, COM ANTECEDENCIA DE UM A NOVE MESAS]
Shigetoshi Sugahara Jan. 1983 92 p refs In PORTUGUESE; ENGLISH summary
(INPE-2628-TDL/111) Avail: NTIS HC A05/MF A01

The statistical techniques of correlation, regression and principal components were employed to study the viability of long range (1 to 9 months) precipitation forecasting for Northeast Brazil, during the rainy season. The predictors were defined by taking lag correlations between precipitation in Northeast Brazil and meteorological parameters, for several stations located between 60 N and 60 S. The use for the precipitation data itself, observed prior to the rainy season, was tested as a possible predictor. From the variables which have the highest correlations with Northeast precipitation, the effective predictors were selected and prediction analysis was made applying the multiple linear regression technique. The results of the regression analysis were encouraging at least in indicating the tendency for precipitation to be above or below normal. However, the numerical values obtained with the regression equation do not always compare well with the observations. A detailed analysis of the correlation coefficients showed that their values were dependent on the sample size. Author

N83-25319# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SYNOPTIC METEOROLOGY, PART 1 [METEOROLOGIA SINOTICA, PARTE 1]
Vernon E. Kousky and Marlene Elias Dec. 1982 119 p refs In PORTUGUESE; ENGLISH summary
(INPE-2605-MD/021) Avail: NTIS HC A06/MF A01

The theoretical and practical aspects of synoptic meteorology are addressed. Emphasis is given to the strong relationship that exists between Dynamic and Synoptic Meteorology. Weather analysis and the important utilization of satellite derived information in Synoptic Meteorology will be treated in the second part. Author

N83-25320*# Computer Sciences Corp., Huntsville, Ala.
VECTOR WIND PROFILE GUST MODEL Final Report, 14 Apr. 1982 - 13 Apr. 1983
Stanley I. Adelfang 28 Mar. 1983 5 p
(Contract NAS8-33433)
(NASA-CR-170762; NAS 1.26:170762) Avail: NTIS HC A02/MF A01 CSCL 04B

A five parameter gamma distribution (BGD) having two shape parameters, two location parameters, and a correlation parameter is investigated. This general BGD is expressed as a double series and as a single series of the modified bessel function, and reduces to the known special case for equal shape parameters. Practical functions for computer evaluations for the general BGD and for special cases are presented. Applications are to be bound in reliability theory, signal noise, and meteorology. Applications to wind gust modeling for the ascent flight of the space shuttle are illustrated. Author

N83-25321# Wisconsin Univ., Madison. Mathematics Research Center.
FRONTOGENESIS IN AN ADVECTIVE MIXED LAYER MODEL Summary Report
Will P. M. deRuijter Oct. 1982 28 p refs Sponsored in part by NOAA and Netherlands Ministry of Transportation and Public Works
(Contract DAAG29-80-C-0041)
(AD-A124350; MRC-TSR-2434) Avail: NTIS HC A03/MF A01 CSCL 12/1

Through an analysis of a more dimensional extension of the bulk mixed layer model of Kraus and Tuner (1967) it is shown how even under spatially uniform atmospheric conditions an initially smooth horizontal temperature gradient in the surface mixed layer can still develop into a front. Essential for it is the notion that the net downward heat flux at the air-water interface is related to the difference between the mixed layer temperature T and an apparent atmospheric temperature TA (Hanley, 1971) so that the initial horizontal gradient in T corresponds to a horizontal variation in the surface buoyancy flux. As a result also the mixed layer depth differs from place to place. Depending on the direction of the wind driven transport this produces either a steepening or a flattening of the initial temperature profile. A lower bound condition for the initial horizontal advective heat flux is derived in terms of the initial surface heat flux, the stirring by the wind and the time rate of change of the apparent atmospheric temperature. If that condition is satisfied a front develops. If not, then frontogenesis is prevented by the damping effect of the local atmospheric heating. It is shown that the condition can be satisfied on the scales of lakes (or small seas) and in near equatorial oceanic regions. Mathematically the problem boils down to a first order quasilinear hyperbolic partial differential equation that is solved exactly by the method of characteristics. Author (GRA)

N83-25322# Pacific Missile Test Center, Point Mugu, Calif.
GUIDELINES FOR CORRECTION OF RADIOSONDE-DERIVED REFRACTIVE PROFILES AND CLIMATOLOGIES
R. A. Helvey 30 Nov. 1982 17 p refs
(AD-A124351; PMTC-TP-000002) Avail: NTIS HC A02/MF A01 CSCL 04/2

Substantially more frequent occurrences of surface-based superrefractive and trapping layers have been noted in daytime than in nighttime historical refractive data derived from standard American radiosondes (military and civilian). Evidence indicates that this diurnal bias is largely or entirely fictitious. Estimates of electromagnetic propagation based on these data will be correspondingly compromised or invalidated. Several factors contribute to this bias, including sensors and sonde characteristics, exposure prior to release, and sampling and reduction procedures. This report discusses these factors, and presents recommendations both for revision of existing refractive statistics, and modifications to radiosonde observation and reduction procedures which should lead to substantial improvement in data for operational and climatological applications. GRA

N83-25323# Pacific Missile Test Center, Point Mugu, Calif.
AIR MASS TRAJECTORIES AND ATMOSPHERIC RADON MEASUREMENTS DURING THE EOMET/OSP EXPERIMENTS ON SAN NICOLAS ISLAND (1978 - 1980)
Terry E. Battalino and Roger A. Helvey Nov. 1982 34 p refs
(AD-A123517; PMTC-TP-000001) Avail: NTIS HC A03/MF A01 CSCL 04/2

The characteristic properties and evolutionary processes of naturally occurring and man-made aerosols is subject of considerable importance for modeling electro-optical propagation through the atmosphere. The Navy's effort is centered upon predicting propagation conditions that impact on sensor and communications systems in the marine environment. Since the aerosol properties of an air mass depend primarily upon its source region and upon the alteration is undergoes in transit to the observation site, effective methods for air mass tracing are essential for modeling the atmosphere-optical environment. A series of five electro-optical field programs conducted at San Nicolas Island (1978-1980) afforded an opportunity to compare two independent methods for identifying air mass regimes. One technique utilized measurements of atmospheric radon concentrations as an air mass

tracer while the other approach employed a computerized objective analysis scheme to automatically construct surface air trajectories. GRA

N83-25324# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
ATMOSPHERIC TRANSPORT AND DISPERSION MODEL: USER'S MANUAL
Robert Cox Oct. 1982 22 p
(AD-A123352; AD-E850216; USAFETAC/TN-82/006) Avail: NTIS HC A02/MF A01 CSCL 04/2

The Atmospheric Transport and Dispersion Model (ATAD) is oriented toward transport and dispersion studies. It can calculate trajectories of 5-days' duration either forward or backward in time at 6-hour intervals during any selected period for any number of requested locations. The individual trajectories are calculated using transport winds averaged in a vertical layer. There are various optional and standard output characteristics. They include tables of transport layer depth, maximum vertical wind shear, trajectory positions, trajectory plots, and surface air concentrations. This program was developed for an IBM 4341 computer using the OS operating system. GRA

N83-25325# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
BASIC TECHNIQUES IN ENVIRONMENTAL SIMULATION
Roger C. Whiton and Emil M. Berecek Jul. 1982 144 p refs
(AD-A123342; AD-E850217; USAFETAC/TN-82/004) Avail: NTIS HC A07/MF A01 CSCL 04/2

Environmental simulation modeling is defined as the generation of synthetic weather observations and forecasts by use of mathematical/ statistical models. Basic concepts in environmental simulation modeling are described, with emphasis on underlying statistical fundamentals, stochastic processes, and Markov processes. Four principle environmental simulation models and their application are described in detail. The treatment begins with the single- variable, single-station model, V1S1, and is extended to the two-variable, single-station model V2S1. The multivariate triangular matrix model, MULTRI, is then discussed; that model is capable of generating vectors of N correlated variables. A case study is presented showing the application of MULTRI to modeling point sky cover distributions at station pairs or at a single station for N lag times. The most complex model in the series of four is the two-dimensional field simulation model, 2DFLD, capable of producing spatially correlated, synthetic, two-dimensional fields or networks or variables. Statistical methods used in developing environmental simulation models are described, with particular emphasis placed on how to fit probability distribution functions to weather variables. GRA

N83-25326# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
REMOTE SENSING OF BATTLEFIELD WEATHER CONDITIONS USING UNMANNED AIR VEHICLES Final Report, 1 Nov. 1981 - 1 Sept. 1982
Maynard L. Hill, B. Lucero, J. Rowland, D. Sheppard, and R. Constantine Sep. 1982 138 p refs
(Contract N00024-81-C-5301)
(AD-A124275; AFGL-TR-82-0329) Avail: NTIS HC A07/MF A01 CSCL 01/3

Presently fielded meteorological sensing and forecast systems do not provide adequate knowledge of visibility, cloud cover and other weather conditions in the lower atmosphere over target areas up to several hundred kilometers inside enemy-controlled territory. The effectiveness of electro-optical weapons could be enhanced if such information could be made available for tactical decisions aids. The use of unmanned air vehicles for this purpose is discussed in this report. Possible systems based on propellor-driven mini remotely piloted vehicles, jet-propelled target drones and unguided ballistic rockets have been analysed from the viewpoint of the aero-propulsive performance, guidance and navigation capabilities. Rudimetary cost estimates for vehicles and other components are included. Existing propellor-driven mini RPVs are inappropriate for the mission because of their relatively slow speed (around 100 knots). Time periods up to 7.5 hours would be involved in the data collection processes. Jet-propelled vehicles would be capable of performing the same missions in periods of about 1 hour. A rocket sounding system would reach the target area in about 7 minutes. GRA

N83-25327# HSS, Inc., Bedford, Mass.
DEVELOPMENT OF AN AIRBORNE VISIBILITY METER Final Report, 20 Feb. 1981 - 30 Sep. 1982
D. F. Hansen 15 Nov. 1982 170 p refs
(Contract F19628-81-C-0005)
(AD-A124276; HSS-B-092; AFGL-TR-82-0328) Avail: NTIS HC A08/MF A01 CSCL 01/3

A light-weight, compact nephelometer for the detection of cloud presence and the estimation of visual range was designed, fabricated, and tested. The device is intended for airborne deployment for use in a tactical weather observation system and in support of precision guided munition missions. The sensor is a fixed angle nephelometer utilizing an infrared diode at 0.88 micrometers and a silicon photovoltaic detector. The sensor was calibrated in an environmental fog chamber over a wide range of fog and haze conditions. The sensor was found to have a very wide dynamic range of sensitivity (over the decades of attenuation coefficient) and, within operational requirements for accuracy, its performance can be described by a universal algorithm. The nephelometer was field tested at AFGL's Weather Test Facility at Otis AFB; high correlations were observed with transmissometers and other forward-scatter meters. GRA

N83-25328# University of Central Florida, Orlando. Dept. of Mathematics and Statistics.
ESTIMATING A FAMILY OF DISTRIBUTIONS WITH APPLICATIONS TO THE EXTENSION OF CLIMATOLOGY Scientific Progress Report, 15 Apr. - 1 Sep. 1982
S. J. Bean and P. N. Somerville Hanscom AFB, Mass. AFGL 16 Aug. 1982 13 p refs
(Contract F19628-82-K-0001; AF Proj. 6670)
(AD-A123385; AFGL-TR-82-0239; SR-2) Avail: NTIS HC A02/MF A01 CSCL 12/1

A family of distributions is used to model a climatic (or other) variable over a region. The entire family of distributions may be estimated by utilizing a sample of locations throughout the region and the dependence of the parameters of distributions on independent variables. Regression models are used to estimate the parameters for a location with given values of the independent variables. Author (GRA)

N83-25329# Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
WEATHER FORECAST ADJUSTMENT USING MODEL OUTPUT CLOUD FIELDS AND DIGITAL SATELLITE DATA Final Report, 1 Nov. 1980 - 15 Apr. 1982
Donald L. Reinke and Thomas H. VonderHaar Aug. 1982 114 p refs
(Contract F19628-78-C-0207; AF Proj. 6670)
(AD-A123702; AFGL-TR-82-0168) Avail: NTIS HC A06/MF A01 CSCL 04/2

The technique of using digital satellite data to monitor the accuracy of model output derived cloud fields is examined to determine its feasibility and practicability. Cloud fields are produced from ceiling and cloud amount forecasts based on Model Output Statistic equations. Their cloud fields are displayed on a coordinate system that is compatible with a corresponding display of digitized GOES satellite data. The model output cloud fields are displayed over a 12-hour forecast period to depict what the satellite cloud field should look like at some future time. The technique was found to be both feasible and easily adapted for use on an interactive display system. Simultaneous display of the forecast and observed cloud fields appear to be a useful tool to aid in short range forecasting decisions and for monitoring the existing forecast. Author (GRA)

N83-25330# Air Force Environmental Technical Applications Center, Scott AFB, Ill.
SITUATION CLIMATIC BRIEFS
Sep. 1982 444 p
(AD-A123369; AD-E850214; USAFETAC/DS-82/050) Avail: NTIS HC A19/MF A01 CSCL 04/2

The Situation Climatic Briefs present narrative climatologies of a country or geographical area by season. They describe weather factors that could significantly affect military operations. Each situation climatic brief presents a general overview of the climate and descriptions of flying weather, reconnaissance weather, terminal weather, exposure weather, paradrop weather, and astronomical data. Some briefs also contain descriptions of seastate, extreme weather, port conditions, or beach conditions.
GRA

N83-25331# ADAPT Service Corp., Reading, Mass.
MACHINE CLASSIFICATION OF CLOUD PARTICLE TYPES Final Report, Jan. 1981 - Jul. 1982
Herbert E. Hunter Aug. 1982 114 p refs
(Contract F19628-81-C-0047; AF Proj. 6670)
(AD-A123402; ADAPT-82-4; AFGL-TR-82-0298) Avail: NTIS HC A06/MF A01 CSCL 04/2

Classification algorithms have been developed to separate cloud particles into: (1) dendrites, (2) needles, (3) columns, (4) plates, (5) streakers, and (6) a miscellaneous or an unclassifiable class. These algorithms have been incorporated in scheme which when applied to shadow graph images produced by the Knollenberg laser scanning device have demonstrated a capability to classify more accurately than human classifiers and a relative insensitivity to particle orientation. It was concluded that the machine classification developed was greatly superior to manual classification for day to day identification of these particles because the machine classifiers were much faster, less costly, did not suffer from fatigue and were usually more accurate, (i.e., in better agreement with the trainer) then human classifications.
Author (GRA)

N83-25332# Butler Univ., Indianapolis, Ind.
RECENT CHANGES IN THE GLOBAL CARBON BALANCE OF TROPICAL ORGANIC SOILS
T. V. Armentano, A. delaCruz, M. Duever, O. L. Loucks, W. Meijer, P. J. Mulholland, R. L. Rate, III, and D. Whigham Jan. 1983 62 p refs
(Contract DE-AC02-82ER-60104)
(DE83-006814; DOE/ER-60104/1) Avail: NTIS HC A04/MF A01

Tropical organic soils, which store at least 90 x 10(9) gigatons (Gt) of organic carbon in upper layers, form a distinct pool in the terrestrial biosphere. Although ordinarily functioning as carbon sinks through the continuing storage of unoxidized plant residues, the pool as a whole now appears to be undergoing a transition with respect to carbon balance. Based on analysis of available data, it appears that over the past decade or so, around 0.07 to 0.18 Gt of carbon has been released to the atmosphere annually. The flux is associated principally with reclamation of Histosols for food production. Opening up of organic soil pools is occurring principally in southeast Asia, where the largest Histosol pools are located. Lower carbon releases, however, also are occurring in Latin America and Africa. The future carbon balance of tropical organic soils will depend to a considerable extent upon the success of recent initiatives to increase yield of agricultural and aquacultural products from previously unutilized organic soils deposits in large wetlands.
GRA

N83-25333# Midwest Research Inst., Golden, Colo. Solar Energy Research Inst.
PROTECTING WIND ACCESS: A PRELIMINARY ASSESSMENT
Robert J. Noun and D. Perkins-Smith Jun. 1982 13 p refs
(Contract DE-AC02-77CH-00178)
(DE82-019128; SERI/TP-211-1647) Avail: NTIS HC A02/MF A01

The identification of suitable sites for large wind machine clusters, or wind farms, requires more than finding a location with an adequate wind resource were discussed. The affect of land use policies and regulations on the siting of wind system installations is considered. In particular, the issue of acquiring wind rights, or guaranteed access to the wind resource for electric power generation, will be vital to the development of wind energy. Several methods for acquiring and preserving access to the wind resource and for dealing with related land-use issues are examined.
DOE

N83-25334# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Chemistry.
ENERGY SOURCES AND CLIMATE
Melvin Calvin 27 May 1982 15 p refs
(Contract DE-AC03-76SF-00098)
(DE82-020612; LBL-14496) Avail: NTIS HC A02/MF A01

The existing data on the effect of the use of fossil carbon as an energy source over the last two centuries on the atmospheric composition of the Earth were analyzed. It is concluded that there is a set of independent observations which, taken together, make likely a global climatic change as a result of the increased carbon dioxide level from these fossil energy sources. Alternative sources are recommended.
DOE

N83-25335# Brookhaven National Lab., Upton, N. Y. Atmospheric Sciences Div.
MONEX79 ATMOSPHERIC BOUNDARY-LAYER EXPERIMENT OVER THE BAY OF BENGAL: DIGHA DATA REPORT
S. SethuRaman and C. Henderson Aug. 1982 63 p refs Sponsored in part by NSF
(Contract DE-AC02-76CH-00016)
(DE83-005456; BNL-51606) Avail: NTIS HC A04/MF A01

An atmospheric boundary layer experiment was conducted over the Bay of Bengal during MONEX79 at the coast of Digha, West Bengal, India located at 21030'N, 880E. The boundary layer experiment consisted of continuous measurements of meteorological variables, turbulence and surface fluxes, and profiles of wind speed and direction in the marine boundary layer. The observation system used in the experiment is briefly discussed, and a summary of the data collected reported.
DOE

N83-25336# Los Alamos Scientific Lab., N. Mex.
DIURNAL VARIABILITY OF WIND VELOCITY INCREASE WITH HEIGHT
W. V. Abeele Dec. 1982 9 p refs
(Contract W-7405-eng-36)
(DE83-005604; LA-9601-MS) Avail: NTIS HC A02/MF A01

All indications are that wind velocity increase with height is a strong function of temperature stratification. The stronger the inversion, the greater the increase in wind velocity with height, whereas the more lapse rates are most likely to be found about noon, it is expected that the wind speed increase will reach a minimum about that time. Inversions are predominantly night and morning phenomena; thus, a maximum increase in wind speed with height will be obtained at those times.
DOE

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-25337*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
BEAUFORT/BERING 1979 MICROWAVE REMOTE SENSING DATA CATALOG REPORT, 14-24 MARCH 1979
William S. Hirstein (Bionetics Corp., Hampton, Va.), Harold F. Hennigar (Deepsea Ventures, Inc., Gloucester Point, Va.), Sally K. Schaffner (OAO Corp., Hampton, Va.), Victor E. Delnore (Kentron International, Inc., Hampton, Va.), and William L. Grantham May 1983 112 p refs
(NASA-TM-84609; L-15554; NAS 1.15:84609) Avail: NTIS HC A06/MF A01 CSCL 05B

The airborne microwave remote sending measurements obtained by the Langley Research Center in support of the 1979 Sea-Ice Radar Experiment (SIRE) in the Beaufort and Bering Seas are discussed. The remote sensing objective of SIRE was to define correlations between both active and passive microwave signatures and ice phenomena assocated with practical applications in the Arctic. The instruments used by Langley during SIRE include the stepped frequency microwave radiometer (SFMR), the airborne microwave scatterometer (AMSCAT), the precision radiation thermometer (PRT-5), and metric aerial photography. Remote sensing data are inventoried and cataloged in a user-friendly format. The data catalog is presented as time-history plots when and where data were obtained as well as the sensor configuration.
Author

N83-25338# Old Dominion Univ., Norfolk, Va. Dept. of Oceanography.
TROPIC INTERACTIONS OF THE SEA NETTLE, CHRYSAORA QUINQUECIRRHA
David L. Feigenbaum, David Knowles, and Michael Kelly Mar. 1982 18 p refs
(TR-82-2) Avail: NTIS HC A02/MF A01

Plankton tows were made weekly in the Lafayette River and the abundance of the sea nettle Chrysaora quinquecirrha and the ctenophore Mnemiopsis leidyi estimated volumetrically. At two adjacent stations ctenophores wee abundant at the start of the study. Their abundance dropped markedly when the sea nettles appeared in late June and they remained scarce until August when few sea nettles were left in the area. This was probably caused by the sea nettle feeding on the ctenophore. Experiments run in the laboratory determined rates of water volume swept clean of food and the number of ctenophores eaten per day vs sea nettle diameter. However, container effects and other experimental problems make these data of preliminary value only. Author

N83-25339*# National Center for Atmospheric Research, Boulder, Colo. NASA/NOSS Science Working Group.
NEEDS, OPPORTUNITIES AND STRATEGIES FOR A LONG-TERM OCEANIC SCIENCES SATELLITE PROGRAM
Stanley Ruttenberg, ed. Nov. 1981 92 p refs Sponsored by NASA
(NASA-CR-170275; NAS 1.26:170275; NCAR/TN-185+PPR) Avail: NTIS HC A05/MF A01 CSCL 08C

Several areas of the National Oceanic Satellite System are addressed including Satellite-borne communication systems, subsurface remote sensing, data coordination, color scanners, formatting important historical data sets, and sea surface temperature observations. B.G.

N83-25340# Naval Civil Engineering Lab., Port Hueneme, Calif.
A MODEL FOR ON-OFFSHORE SEDIMENT TRANSPORT IN THE SURFZONE Final Report, Oct. 1981 - Jun. 1982
James A. Bailard Dec. 1982 58 p refs
(ZR00001183; YF60536091)
(AD-A124235; NCEL-TN-1649) Avail: NTIS HC A04/MF A01 CSCL 08/10

An energetics-based surfzone sediment transport model is evaluated for its ability to predict on-offshore sediment movements using nearshore sediment transport study current meter and beach volume measurements. The magnitude and distribution of pertinent wave velocity moments are also evaluated from the same data set. The latter were found to be linear functions of the significant wave height. Results of the study showed that the current meter data were of insufficient length to evaluate the sediment transport model's validity. A simplified version of the model coupled with estimated wave velocity moment regression equations was found to mimic observed beach volume variations as a function of wave height. Author (GRA)

N83-25341# Marine Environments Corp., Manassas, Va.
ASSESSMENT OF SURFACE WAVE EFFECTS ON UPPER OCEAN PARAMETERS Final Report, Mar. 1982 - Jan. 1983
Marshall D. Earle Jan. 1983 93 p refs
(Contract N00014-82-C-0237)
(AD-A124637; MEC-13-W) Avail: NTIS HC A05/MF A01 CSCL 08/3

Effects of surface waves on upper ocean physical oceanographic parameters of interest to the Ocean Measurements program (OMP) are investigated. Three surface wave effects are potentially important to the OMP. These are: generation of inertial currents and associated vertical shear, generation of high frequency internal waves within the seasonal thermocline, and increased mixing and decreased vertical gradients near the surface due to wave breaking and wave maintenance of turbulence. Theory relating to each of these effects is provided and mathematical calculations are made which indicate the potential importance of these effects for the OMP. These effects increase with wind speed and sea state and are thus potentially important in mid-to-high latitude regions. These regions have relatively high wind speeds and wave heights due to prevailing westerly winds and the presence of primary extratropical storm tracks. Surface wave effects are largest near the surface and may be significant for depths less than approximately 100 meters. No measurements have been previously interpreted in a manner to quantitatively determine the importance of these surface wave effects in the actual ocean. Such interpretation is needed because these effects are second order effects in terms of wave theory and existing theoretical approaches involve simplifying assumptions. Without suitable data interpretation, no theoretical or modeling technique can be judged suitable for routine operational use. GRA

N83-25342# Coast Guard, Washington, D.C. Oceanographic Unit.
OCEANOGRAPHIC OBSERVATIONS NORTH PACIFIC OCEAN STATION NOVEMBER AND PACIFIC STANDARD MONITORING SECTIONS P3, P4, P5, AND P6, JULY 1966 - JUNE 1974 Final Report
Bruce W. Platz, Jr., David Szabo, and J. J. Murray 1982 3921 p refs
(AD-A122224; USCG-373-82) Avail: NTIS HC A99/MF A01 CSCL 08/10

Observed and interpolated temperature and salinity data with computed sigma-t values are reviewed for all oceanographic stations occupied by U.S. Coast Guard cutters at Ocean Station NOVEMBER (30 deg 00 N, 140 deg 00 W) and Pacific Standard Monitoring Sections P3, P4, P5, and P6 from July 1966 through June 1974. The analysis of OS NOVEMBER for these eight years compares favorably with seasonal analyses made previously. The water properties show certain seasonal trends with near-surface density appearing to be primarily controlled by temperature. The mixed layer demonstrates an annual growth and decay dependent on changes in atmospheric conditions. The depth of this layer varies from 150 m in March to 10 m in September. Temperatures have an annual periodicity; salinity has a semi-annual periodicity. There is great year-to-year variability in the seasonal layer. Anomalous decreases in temperature were usually accompanied by decreases in salinity. Vertical sections of temperature and salinity for Standard Sections P3, P4, P5, and P6 are examined to determine the seasonal variations of the boundaries between the Pacific Central Water, the Pacific transition zone, and the California Current. These water masses and the limits of their boundaries are identified by the characteristic rising of isotherms and isopycnals, T vs S relationships, and intense horizontal salinity gradients. GRA

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-25343*# Oklahoma State Univ., Stillwater. Dept. of Botany and Microbiology.
MICROBIAL ECOLOGY OF EXTREME ENVIRONMENTS: ANTARCTIC DRY VALLEY YEASTS AND GROWTH IN SUBSTRATE-LIMITED HABITATS Progress Report, 1 Dec. 1981 -

31 Aug. 1982
H. S. Vishniac 31 Aug. 1982 23 p refs
(Grant NAGw-26)
(NASA-CR-170332; NAS 1.26:170332) Avail: NTIS HC A02/MF A01 CSCL 06C

The success of the Antarctic Dry Valley yeasts presumeably results from adaptations to multiple stresses, to low temperatures and susbstrate-limitation as well as prolonged resting periods enforced by low water availability. Previous investigations have suggested that the crucial stress is substrate limitation. Specific adaptations may be pinpointed by comparing the physiology of the Cryptococcus vishniacii complex, the yeasts of the Tyrol Valley, with their congeners from other habitats. Progress was made in methods of isolation and definition of ecological niches, in the design of experiments in competition for limited substrate, and in establishing the relationships of the Cryptococcus vishniacii complex with other yeasts. In the course of investigating relationships, a new method for 25SrRNA homology was developed. For the first time it appears that 25SrRNA homology may reflect parallel or convergent evolution. Author

N83-25344*# Alabama Univ., Birmingham. Dept. of Biochemistry.
THE CHEMICAL BASIS FOR THE ORIGIN OF THE GENETIC CODE AND THE PROCESS OF PROTEIN SYNTHESIS Annual Report
16 Jun. 1982 26 p refs
(Grant NGR-01-010-001)
(NASA-CR-170334; NAS 1.26:170334) Avail: NTIS HC A03/MF A01 CSCL 06C

The major thrust is to understand just how the process of protein synthesis, including that very important aspect, genetic coding, came to be. Two aspects of the problem: the chemistry of active aminoacyl species; and affinities between amino acids and nucleotides, and specifically, how these affinities might affect the chemistry between the two are stressed. Author

N83-25345# Systems Research Labs., Inc., Dayton, Ohio.
BEHAVIORAL AND PHYSIOLOGICAL EFFECTS OF PSYCHOLOGICAL STRESS IN RATS Final Report, Oct. 1980 - Dec. 1981
Jackie Lanum, Michael E. Campbell, Dennis W. Blick, Thomas G. Wheeler, and J. Terry Yates Brooks AFB, Tex. School of Aviation Medicine Nov. 1982 56 p refs
(Contract F33615-80-C-0603; AF Proj. 7757)
(AD-A123428; SAM-TR-82-34) Avail: NTIS HC A04/MF A01 CSCL 06/3

As compared with controls, albino rats stressed by being held immobile for up to 18 hours show behavioral decrements in an open-field activity maze and in two-way shuttle-box avoidance acquisition. The severity of the decrement was increased with increased restraint duration. Males showed greater decrements than females, especially at shorter restraint times. No differences in adrenal weights were associated with the experimental conditions, but the presence of stomach lesions was positively correlated with stress duration and the severity of the behavioral decrement. Author (GRA)

52 AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and weightlessness.

N83-25346* National Aeronautics and Space Administration. Pasadena Office, Calif.
SYSTEM AND METHOD FOR MOVING A PROBE TO FOLLOW MOVEMENTS OF TISSUE Patent
Cyril Feldstein (JPL, California Inst. of Tech., Pasadena), Thomas W. Andrews (JPL, California Inst. of Tech., Pasadena), Donald W. Crawford (JPL, California Inst. of Tech., Pasadena), and Mark A. Cole, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena)
Issued 15 May 1981 6 p Filed 15 May 1981 Supersedes N81-26697 (19 - 17, p 2379) Sponsored by NASA
(NASA-Case-NPO-15197-1; US-Patent-4,378,813; US-Patent-Appl-SN-263957; US-Patent-Class-128-774; US-Patent-Class-128-782; US-Patent-Class-128-303B) Avail: US Patent and Trademark Office CSCL 06B

An apparatus is described for moving a probe that engages moving living tissue such as a heart or an artery that is penetrated by the probe, which moves the probe in synchronism with the tissue to maintain the probe at a constant location with respect to the tissue. The apparatus includes a servo positioner which moves a servo member to maintain a constant distance from a sensed object while applying very little force to the sensed object, and a follower having a stirrup at one end resting on a surface of the living tissue and another end carrying a sensed object adjacent to the servo member. A probe holder has one end mounted on the servo member and another end which holds the probe.
Official Gazette of the U.S. Patent and Trademark Office.

N83-25347* National Aeronautics and Space Administration, Washington, D. C.
AEROSPACE MEDICINE AND BIOLOGY: A CUMULATIVE INDEX TO THE 1982 ISSUES
Jan. 1983 626 p
(NASA-SP-7011(241); NAS 1.21:7011(241)) Avail: NTIS HC $12.00 CSCL 06E

This publication is a cumulative index to the abstracts contained in the Supplements 229 through 240 of Aerospace Medicine and Biology: A continuing Bibliography. It includes three indexes: subject, personal author, and corporate source. Author

N83-25348*# California Univ., San Diego.
RESEARCH EFFORTS Final Report
M. G. Ziegler 1 Apr. 1983 13 p refs
(Contract NAS9-16312)
(NASA-CR-171654; NAS 1.26:171654) Avail: NTIS HC A02/MF A01 CSCL 06E

Conjugated catecholamines, deconjugation of catecholamines in cerebrospinal fluid or urine, the relationship of plasma norepinephrine to levels of severe stress, and catecholamine clearance rates are discussed. Author

N83-25349*# National Aeronautics and Space Administration, Washington, D. C.
SPACE PHYSIOLOGY AND MEDICINE
Arnauld E. Nicogossian and James Fletcher Parker, Jr. (BioTechnology, Inc.) 1982 331 p refs
(NASA-SP-447; NAS 1.21:447; LC-82-23047) Avail: NTIS HC $15.00/MF A01 CSCL 06P

The state of knowledge in space physiology and medicine are reviewed. Overviews of manned space flight, the space environment, spaceflight systems and procedures, physiological adaptation to space flight, health maintenance of space crew members, and medical problems of space flight are presented. S.L.

N83-25350*# Texas A&M Univ., College Station. Veterinary Nuclear Medicine Section.
STUDY OF BEHAVIORAL MODIFICATIONS RESULTING FROM EXPOSURE TO HIGH LET RADIATION Final Report
Dan Hightower, Bonnie Beaver, and Charles L. Hall [1982] 65 p
(Contract NAS9-16375)
(NASA-CR-171651; NAS 1.26:171651) Avail: NTIS HC A04/MF A01 CSCL 06R

Animal irradiations, behavioral studies, neurological studies, and nuclear medicine studies are discussed. Author

N83-25351# Tulane Univ., New Orleans, La. School of Medicine.
CERVICAL SPINE STIFFNESS AND GEOMETRY OF THE YOUNG HUMAN MALE
Y. King Liu, K. W. Krieger, G. Njus, K. Ueno, and M. Connors Wright-Patterson AFB, Ohio Aerospace Medical Research Labs.

Nov. 1982 259 p refs
(Contract F33615-76-C-0526; AF Proj. 7231)
(AD-A123535; AFAMRL-TR-80-138) Avail: NTIS HC A12/MF A01 CSCL 06/19

Injuries to the cervical spine incurred during emergency escape from high-performance aircraft are of concern to the Air Force. To provide for safety design, especially in view of newly considered additional head encumbrances such as helmet-mounted sights and displays, and chemical protection equipment, a detailed dynamic structural model of the human head-spine system has been developed. The presently described effort addresses the collection of cervical spine geometric, material property and failure data for use with this model. Author (GRA)

N83-25352# Naval Health Research Center, San Diego, Calif.
SALIVARY AND PLASMA TESTOSTERONE AND CORTISOL DURING MODERATELY HEAVY EXCERCISE Interim Report
Ross R. Vickers, Jr., James A. Hodgdon, Brad L. Bennett, Russell E. Poland, and R. T. Rubin Apr. 1982 11 p refs
(M0096PN001)
(AD-A122107; NAVHLTHRSCHC-82-5) Avail: NTIS HC A02/MF A01 CSCL 06/5

Saliva may provide a useful alternative to blood for measuring steroid hormones. total plasma and salivary concentrations of cortisol and testosterone were compared in samples taken twice at rest and twice during exercise to determine whether physical activity level affects the relationship between the two. Correlations were consistently high ($r > .82$) for cortisol, but relatively low for testosterone ($r < .66$). Exercise did not affect either correlation. Salivary cortisol is a reasonable alternative to plasma cortisol even during exercise. The testosterone results were equivocal as salivary testosterone could be highly correlated with free plasma testosterone despite the low correlation to total plasma testosterone. Closer examination of the free/total plasma hormone distinction was not possible in the present study, but should be an important focus for further research on salivary steroids. GRA

N83-25353# New York Univ. Medical Center. Dept. of Ophthalmology.
INTRACORTICAL INTERACTIONS FOR ORIENTATION CONTRAST Final Technical Report, 1 Jun. 1981 - 31 Mar. 1982
Jeremiah I. Nelson 31 May 1982 29 p refs
(Contract N62269-81-C-0279)
(AD-A123326; NADC-82199-60) Avail: NTIS HC A03/MF A01 CSCL 05/18

To further our understanding of visual perception at the cellular level, recordings have been made from single neurons in the visual cortex (Area 17) of the cat. It is known that the visual scene is dissected at this level of the visual system according to stimulus attributes of objects in the real world such as color, depth, direction of motion, and orientation as well as position in the visual field. The selectivity of neurons for stimulus orientation has been particularly studied under this contract. The existence of consistent error in perceived orientation has long been known. Such orientation contrast effects are a component in many well-known optical illusions or figural illusions . Mechanisms have been sought in striate cortex (Area 17) which would explain these sensory coding errors. Both inhibitory and facilitatory interactions have been discovered and studied. Their properties are appropriate for a mechanisms of certain other perceptual effects as well as for orientation contrast. Further study of intracortical interactions would provide the knowledge for synthesizing into higher percepts the local visual analysis we now understood on a cell-by-cell basis. Author (GRA)

N83-25354# Naval Health Research Center, San Diego, Calif.
L-TRYPTOPHAN: EFFECTS ON DAYTIME SLEEP LATENCY AND THE WAKING EEG Final Report, Aug. 1978 - Oct. 1982
Cheryl L. Spinweber, Reidun Ursin (Bergen Univ., Norway), Raymond P. Hilbert, and Richard L. Hilderbrand 22 Oct. 1982 18 p refs
(MR0000101; MR04101003)
(AD-A123633; NAVHLTHRSCHC-82-24) Avail: NTIS HC A02/MF A01 CSCL 06/16

The essential amino acid, l-tryptophan, has been shown to reduce sleep latency when administered in doses ranging from 1-15 grams. Because l-tryptophan is regularly ingested in dietary protein foods, it has been called a 'natural hypnotic.' At least one author has suggested that plasma tryptophan, which shows a diurnal rhythm with peak levels in the late evening hours, may be a physiological regulator of sleep onset. However, not all researchers have found that l-tryptophan reduces sleep latency. There is also controversy about whether l-tryptophan administration alters the pattern of EEG-recorded sleep. Finally, the underlying mechanism for the putative hypnotic effects has not been well-established, although serotonergic systems are most likely involved. We conducted this study to determine the effects of l-tryptophan (4 g) on the waking EEG and on daytime sleep. Twenty normal, drug-free adults participated. Subjects were assigned to a morning or afternoon group, and data were collected on two occasions, after l-tryptophan and after placebo, assigned in a counter-balanced order. Blood samples were obtained by venepuncture and later analyzed for total and free tryptophan levels. Daytime nap sleep was recorded and scored according to usual procedures. Waking EEGs were digitized on-line and later analyzed for changes in five frequency bands: 16-40 Hz (beta), 13.0-15.5 Hz (sigma), 8.0-12.5 Hz (alpha), 4.0-7.5 Hz (theta), and 0.5-3.5 Hz (delta). GRA

N83-25355# Fels Research Inst., Yellow Springs, Ohio.
LONGITUDINAL STUDY OF HUMAN HEARINGS: ITS RELATIONSHIP TO NOISE AND OTHER FACTORS. 3: RESULTS FROM THE FIRST FIVE YEARS Draft Report, 16 Apr. 1979 - 15 Jun. 1981
Alexander F. Roche, W. Cameron Chumlea, and Roger M. Siervogel Wright-Patterson AFB, Ohio AMRL Sep. 1982 219 p refs
(Contract F33615-79-C-0526; AF Proj. 7231)
(AD-A123175; AFAMRL-TR-82-68-Pt-3) Avail: NTIS HC A10/MF A01 CSCL 06/19

Analyses have been made of serial data from children aged 6 to 18 years. These data relate to auditory thresholds, noise exposure obtained from questionnaires and dosimetry records and the results of otoscopic, tympanometric and speech discrimination tests. For those children also enrolled in the Fels Longitudinal Study of Growth and Development, there are serial data for body size, maturity, and blood pressure. GRA

N83-25356# Florida Univ., Gainesville. Dept. of Physiological Sciences.
ANALYSIS OF LONG BONE AND VERTEBRAL FAILURE PATTERNS Interim Report, 19 Feb. - 30 Sep. 1982
Jo Ann C. Eurell 30 Sep. 1981 4 p
(Grant AF-AFOSR-0130-80; AF Proj. 2312)
(AD-A123163; AFOSR-82-1067TR) Avail: NTIS HC A02/MF A01 CSCL 06/16

Baboons were dropped vertically from four feet above the ground. The vertebral columns were examined with scanning electron microscopy and light microscopy six months and six years post-impaction. The posterior articulations of the vertebrae had osteoarthritic changes which were probably related to changes previously observed in the anterior portion of the column. These changes seemed to increase in severity with time following the impaction sequence and were probably impaction related. GRA

N83-25357# Federal Aviation Administration, Washington, D.C. Office of Systems Engineering Management.
THE EFFECTS OF PHYSICAL FATIGUE AND ALTITUDE ON PHYSIOLOGICAL, BIOCHEMICAL, AND PERFORMANCE RESPONSES
E. Arnold Higgins, Henry W. Mertens, Jess M. McKenzie, Gordon E. Funkhouser, Mary Ann White, and Nelda J. Milburn May 1982 27 p refs
(AD-A122796; FAA-AM-82-10) Avail: NTIS HC A03/MF A01 CSCL 06/19

Twelve healthy young men were evaluated in each of four experimental conditions involving the possible combinations of two exercise conditions given prior to performance testing (1 h of

heavy exercise vs. no exercise) and two altitude conditions (ground level vs. 12,500 ft) which were administered during performance testing. Performance was measured during a 2 1/4-h test session with the Multiple Task Performance Battery (MTBP) which involved time-shared performance in monitoring of warning lights and meters, mental arithmetic, problem solving, and tracking. Heart rate was statistically higher after exercise than after no exercise and statistically higher at 12,500 ft than at ground level. Norepinephrine excretion was higher during exercise experiments than during no-exercise experiments. There was no altitude effect for this measurement. The overall composite score of MTPB performance was significantly lower at 12,500 ft than at ground level. The adverse effect of higher altitude was greatest in the tracking task. The 1-h period of vigorous physical exercise had no statistically significant main effect on overall MTPB scores. Residual effects of exercise resulting in increased arousal may account for the tendency for performance to be slightly higher in the case of problem solving. The interaction of altitude with exercise was also significant in the case of tracking performance. The most important aspect of the interaction was that tracking performance was significantly better at 12,500 ft following exercise. GRA

N83-25358# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AN ASSESSMENT OF THE RELATIONSHIP BETWEEN THE CORONARY-PRONE (TYPE A) BEHAVIOR PATTERN, STRESS, AND CORONARY HEART DISEASE M.S. Thesis

Thomas J. McDonald Sep. 1982 165 p refs

(AD-A122809; AFIT-LSSR-32-82) Avail: NTIS HC A08/MF A01 CSCL 06/5

This cross-sectional study examines the relationships between the coronary-prone (Tpe A) behavior pattern, stress, and coronary heart disease (CHD). Past research indicates that Type A behavior is related to both CHD and stress. Behavioral and organizational data were obtained from 438 respondents; physiological data were obtained from 368 respondents. The physiological data included cholesterol, HDL cholesterol (HDL), and cortisol. Cholesterol, HDL, and the ratio of cholesterol divided by HDL (ratio) were used as indicators of CHD. Cortisol was used as the indicator of felt stress. Factor analysis and multiple regression analysis were employed. Analyses supported using ratio, cholesterol, and HDL as indicators of CHD; cortisol was not representative of felt stress. The results indicate that Type A behavior and its job involvement dimension are only weakly and positively related to CHD. The speed and impatience dimension demonstrated a stronger, positive relationship with CHD. The hard driving and competitive dimension was inversely related to CHD, with the competitive component controlling the direction of the relationship. GRA

N83-25359# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Systems and Logistics.

AIR FORCE PHYSICAL FITNESS: AS ASSESSMENT OF CHARACTERISTICS AND PROGRAMS WHICH AFFECT INDIVIDUAL PHYSICAL FITNESS M.S. Thesis

Robbin R. Schellhous Sep. 1982 190 p refs

(AD-A123022; AFIT-LSSR-63-82) Avail: NTIS HC A09/MF A01 CSCL 06/14

The Air Force physical fitness program has undergone four major changes since the Air Force became a separate service in 1947. Results of this study indicate that the current fitness program has not yet produced a uniformly high level of physical fitness among Air Force members; only 40 percent of Air Force males are in at least a passing aerobic fitness category, and 20 percent get no weekly aerobic exercise whatsoever. Data collected from a survey questionnaire sent to 1600 randomly selected Air Force members assessed the relationship between individual aerobic fitness (as measured by existing Air Force aerobic activity standards) and several other variables, including age, weight, rank, flying status, perceived degree of supervisory support, and availability, adequacy, and use of installation fitness facilities. Individual aerobic fitness is most strongly related to the number of duty hours used for aerobic activities, but fitness is not directly related to degree of adherence to weight standards. Fitness does not depend on support from supervisors and commanders or on the adequacy of existing facilities. Author (GRA)

N83-25360# Naval Health Research Center, San Diego, Calif.

SLEEP SPINDLE AND DELTA CHANGES DURING CHRONIC USE OF A SHORT-ACTING AND A LONG-ACTING BENZODIAZEPINE HYPNOTIC Interim Report

Laverne C. Johnson, Cheryl L. Spinweber, Wesley F. Seidel, and William C. Dement 10 Nov. 1982 10 p refs Presented at the Ann. Meeting of the Assoc. for the Psychophysiol. Study of Sleep, San Antonio, 16-20 Jun. 1982

(MR04101003)

(AD-A123149; NAVHLTLRSCHC-81-10) Avail: NTIS HC A02/MF A01 CSCL 06/15

The goals of this study were to measure EEG sleep changes during 5 weeks of benzodiazepine use, describe the magnitude and pattern of change for a short-acting and a long-acting benzodiazepine, and determine if EEG changes were related to levels of drug in plasma. Twenty-one patients, 4 males and 17 females, mean age 43 + or - 12.7 years, participated. All were diagnosed as chronic insomniacs. After 3 baseline nights, all patients received placebos for 9 nights. Patients then received trizolam (0.5 mg), flurazepam (30 mg), or placebo for 37 nights. All patients received palcebo during 10 withdrawal nights. EEG (C3-A2 or C4 -A1) was recorded on FM tape for delta and spindle analysis on 7 of the 59 nights (placebo nights 1 and 7; treatment nights 6, 20, and 34, and placebo withdrawal nights 4 and 120). Detection of delta half waves (0.5-2.0 Hz) and sleep spindle bursts (11.75-15.0 Hz) during NREM sleep was accomplished off-line with the Smith Phasic EEG detector. Blood for plasma analysis was drawn before evening medication on baseline night 5 and treatment nights 3, 7, 21, 35, and on the fifth withdrawal night. GRA

N83-25361# Naval Medical Research Inst., Bethesda, Md.

DATA ACQUISITION AND ANALYSIS SOFTWARE FOR THERMAL STRESS STUDIES Final Medical Progress Report

R. P. Layton Apr. 1982 101 p refs

(AD-A122567; NMRI-82-3) Avail: NTIS HC A06/MF A01 CSCL 06/16

A system to monitor cutaneous heat flow and temperature at individual body sites using heat flux transducers has been previously reported. Data acquisition for this system has been automated using a desktop computer. Programs have been developed to aid in the scaling, plotting, and analyzing of experimental data. The details of this software package are the subject of this report. Author (GRA)

N83-25362# Naval Medical Research Inst., Bethesda, Md.

COMPUTER-ASSISTED SYSTEM FOR DETERMINATION OF O2 CONSUMPTION AND CO2 PRODUCTION IN MAN Final Report

R. P. Layton and E. T. Flynn Apr. 1982 43 p refs

(AD-A122525; NMRI-82-1) Avail: NTIS HC A03/MF A01 CSCL 06/16

Determination of oxygen and carbon dioxide production rates are routinely made in the exercise physiology laboratory. A semi-automated, portable system based on a desktop computer has been developed. Expired gas from several breaths, collected in a bag, has its volume measured with a spirometer. The oxygen and carbon dioxide concentrations are directly read by the computer from the appropriate gas analyzers. The computations needed to evaluate oxygen consumption, carbon dioxide production and respiratory exchange ratio are automatically performed and the results immediately displayed. Measured volumes are accurate + or - 0.010 liters absolute and gas concentrations are reproducible to + or - 0.01% absolute. The system is technically simple and can be learned quickly by even relatively inexperienced operators. GRA

N83-25363# Naval Medical Research Inst., Bethesda, Md.

CALIBRATOR FOR AN ELECTROMAGNETICALLY BRAKED BICYCLE ERGOMETER Final Medical Research Progress Report

R. P. Layton and W. A. Tetrault Apr. 1982 22 p refs

(AD-A122511; NMRI-82-4) Avail: NTIS HC A02/MF A01 CSCL 06/19

The electromagnetically braked bicycle ergometer is frequently used in the exercise physiology laboratory as a source of known workload. Normally the accuracy of the device cannot be verified without returning it to the factory for recalibration, a costly and time-consuming process. An instrument that can provide either a quick check of the proper functioning of an ergometer or a highly accurate calibration curve is the subject of this report.

Author (GRA)

N83-25364# California Univ., La Jolla. Dept. of Psychiatry.
SLEEP LOSS EFFECTS ON CONTINUOUS SUSTAINED PERFORMANCE Final Report, Mar. 1981 - Nov. 1982
Daniel J. Mullaney, Daniel F. Kripke, Paul A. Fleck, and Nobuyuki Okudaira 30 Nov. 1982 44 p refs
(Contracts N00014-79-C-0317; DAMD17-78-C-8040)
(AD-A122392; FR-3) Avail: NTIS HC A03/MF A01 CSCL 05/10

The ability to sustain continuous performance for up to 42 hours was studied with 30 subjects. During each 10 minutes, subjects performed a tracking task, a pattern memory task, an addition task, and provided subjective ratings on sleepiness and attention-fantasy scales plus a brief written description summarizing their thoughts. Of the 10 subjects required to work alone, 4 did not complete the 42 hours and 9 experienced 'psychological events' such as hallucinations, visual illusions, and disorientation. Of the 20 subjects who began the 42-hour task in pairs, 5 did not complete the 42 hours and 13 experienced similar psychological events. The percentage who did not complete the 42 hours of study and the incidence of psychological events were not significantly different for subjects working alone and in pairs. Performance results were very similar. No significant relationship of psychological events to any of our performance measures was demonstrated. These results indicate that continuous sustained performance in itself causes rapid deterioration of performance and psychological disturbances, regardless of the presence or absence of social contact. Author (GRA)

N83-25365# Mason (Virginia) Research Center, Seattle, Wash.
INTERACTION OF ANTI-G MEASURES AND CHEST WALL MECHANICS IN DETERMINING GAS EXCHANGE Annual Progress Report, 1 Apr. 1981 - 31 Mar. 1982
Harold I. Modell May 1982 26 p refs
(Contract F49620-79-C-0058; AF Proj. 2312)
(AD-A122297; AFOSR-82-1046TR) Avail: NTIS HC A03/MF A01 CSCL 09/19

During the last twelve months, progress has been made in three experimental areas: (1) determination that right ventricular blood provides an accurate mixed venous blood sample in the canine; (2) investigation of gas exchange during repeated canine +Gz exposures; and (3) characterization of pressure-volume relationships of the pig lung and chest wall. It is generally assumed that pulmonary arterial blood best represents mixed venous blood. Under some conditions (e.g., during +Gz stress) sampling from this site is difficult. To determine if the right ventricle is as good a sampling site as the pulmonary artery in the dog, samples were drawn from both sites and compared for blood gas composition. No physiologically significant differences were detected between the two sites in this species. Results of our earlier studies indicated that exposure to +Gz stress in the presence of G-suit abdominal bladder inflation and breathing air leads to a gas exchange detriment lasting as long as three minutes post-exposure. To determine if this detriment is cumulative on repeated exposure, dogs were exposed to two episodes of +Gz stress separated by a three-minute recovery period. Blood gas status during the last 20 seconds of each 60-second exposure was assessed. Results indicated that the same degree of detriment occurred during both exposures. Pig chest wall shape and compliance is closer to man's than is the dog chest wall. GRA

N83-25366# School of Aerospace Medicine, Brooks AFB, Tex.
OCULAR THERMAL INJURY FROM INTENSE LIGHT Final Report, Jun. 1981 - Mar. 1982
Ralph G. Allen and Garrett D. Polhamus Sep. 1982 45 p refs (AF Proj. 7757)
(AD-A122226; SAM-TR-82-25) Avail: NTIS HC A03/MF A01 CSCL 06/18

Injury from exposure to intense light has been a longstanding concern - particularly ocular damage such as solar eclipse burns, snow blindness, and glass blower's cataracts. The development of intense light sources by man, culminating (to date) with lasers, has increased the possibility of accidental ocular exposures. Systematic laboratory study of ocular damage began in the early 1950's and has progressed more or less continuously ever since. Probably the most understood mechanism of injury is that described as thermal. Rather thorough models of this mechanism exist and have been validated reasonably well within the limits of their applicability. However, other mechanisms of injury (such as acoustical shock waves, and photochemical interactions) have been identified and have received considerable attention in the past decade. The results of the research efforts of many investigators over a considerbale span have been incorporated in numerous laser safety standards, typified by the American National Standards Institute Z136.1 Standard for the Safe Use of Lasers. These standards, although carefully conceived and based upon a large body of empirical information, are neither complete nor final and should be updated as additional information is obtained.

Author (GRA)

N83-25367# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
BIOLOGICAL EFFECTS OF STATIC MAGNETIC FIELDS: A SELECTIVE REVIEW WITH EMPHASIS ON RISK ASSESSMENT
C. E. Easterly Apr. 1982 78 p refs
(Contract W-7405-eng-26)
(DE82-013350; ORNL/TM-7860) Avail: NTIS HC A05/MF A01

The status of magnetic field information that is applicable to risk assessment is discussed. Hence, an attempt is made to identify both the literature that is useful to the goal of risk assessment and a framework within which risk assessment methodologies can be derived. From this selected review, it is concluded that three areas exist for which adequate information can be found to begin modelling: disease induction, reproduction and developoment, and cardiovascular response. The first two are supported by a combination of positive and negative findings and the last by a calculational technique which utilizes the physically well-known principle of flow retardation for a conducting fluid moving through a magnetic field. DOE

N83-25368# Los Alamos Scientific Lab., N. Mex. Group MP-3.
LENS* 4: A PROGRAM FOR CALCULATION OF GEOMETRIC OPTICS OF THE HUMAN EYE
James D. Doss Oct. 1982 17 p refs
(Contract W-7405-eng-36)
(DE83-003890; LA-9539-MS) Avail: NTIS HC A02/MF A01

A computer program (LENS* 4) has been written that is used for ray-trace calculations of human or animal eyes. The user enters all relevant eye specifications, and the program calculates ray segments from a (specified) external object. From the ray calculations, the program yields data on image location, image distance from the retina, retinal spot size, and effective pupil diameter. The program also allows entry of simple corrective lens systems that simulate a contact lens or ordinary spectacles. Graphics output illustrating the eye cross section, corrective lens, and rays is provided either on the CRT, thermal printer, or graphics plotter. Although the program is written in BASIC, many of the statements (particularly in the graphics section) are peculiar to the Hewlett-Packard 9845B desktop computer. DOE

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-25369# Pittsburgh Univ., Learning Research and Development Center.
SIMULATION SYSTEMS FOR COGNITIVE PSYCHOLOGY
Robert Neches Aug. 1982 67 p refs
(Contract N0014-79-C-0215; NR Proj. 667-430)
(AD-A123394; UPITT/LRDC/ONR/APS-12) Avail: NTIS HC A04/MF A01 CSCL 05/10

Three views of the function of computer simulation in cognitive psychology are analyzed. The strong view that computer simulations will produce more rigorously specified theories is seen to be overstating the case. Two more pragmatic views are supported. One looks at computer method as a means of exploring or validating psychological theories. The other looks to computer simulation as a source of useful concepts. Several simulation efforts are presented as illustrations of these latter views. After establishing some perspective on the uses of simulation, the discussion turns to psychological simulation languages, and to aspects of programming environments which facilitate simulation work. A new simulation language, PRISM, is described. GRA

N83-25370# Cornell Univ., Ithaca, N. Y. Dept. of Education.
THE PERCEPTION OF OBJECTS AND THEIR FUNCTIONAL USES Technical Report, 31 May - 30 Nov. 1982
Marie Knowlton, Frank Keil, and Marvin D. Glock Nov. 1982 47 p refs
(Contract N00014-80-C-0372; NR Proj. 157-452; RR0420602)
(AD-A122797; TR-9-Ser-B; TR-8) Avail: NTIS HC A03/MF A01 CSCL 06/16

Five common objects were selected to which multiple uses could be assigned. The eye scanning patterns of 43 subjects were examined as they made decisions regarding possible functional uses of these objects. We hypothesized that special features of objects must be attended to before such decisions can be made. The stimuli were line drawings of the objects with specific feature areas delineated. Each object was shown in four orientations selected by rotating the object in the picture plane by 90 degree increments. Correlations were computed between the fixations in each of the feature areas and canonical and functional scales developed by independent introspective ratings. Significant correlations occurred with specific areas of familiar objects and the canonical scales. One unfamiliar object had significant correlations with the functional scales for that object. Therefore, subjects did rely on specific features to identify the objects and apparently used the features to retrieve a semantic label from which they made inferences about functional information. Author (GRA)

N83-25371# Naval Postgraduate School, Monterey, Calif.
PILOT SELECTION CRITERIA FOR THE AH-64 HELICOPTER M.S. thesis
Richard Diamond Dec. 1982 72 p refs
(AD-A122495) Avail: NTIS HC A05/MF A01 CSCL 05/9

This thesis uses statistical analysis methods and subjective decisions to determine the parameters necessary to establish crew selection criteria for the AH-64 attack helicopter. The purpose of establishing these parameters is to aid the Army in establishing pilot selection criteria for the AH-64. The techniques of simple linear regresssion and nonparametric statistics indicated that the greater the experience level the better performance level achieved. The analysis of crews determined that less experienced crews performed proportionately as well as the more experienced crews. Curiously, the amount of experience of the pilot is not a determining factor, whereas the copilot gunners experience is directly related to how well the crew performed. Crew selection for the AH-64 helicopter should be made from the existing AH-1 series community of aviators with the more experienced aviators performing duties as copilot gunner. GRA

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-25372*# GARD, Inc., Niles, Ill.
DEVELOPMENT OF A CONDENSER FOR THE DUAL CATALYST WATER RECOVERY SYSTEM
P. Budinikas, F. Rasouli, and N. Rabadi Mar. 1983 80 p refs
(Contract NAS2-11045)
(NASA-CR-166478; NAS 1.26:166478) Avail: NTIS HC A05/MF A01 CSCL 06K

Conceptual evaporation/condensation systems suitable for integration with the catalytic water recovery method were evaluated. The primary requirements for each concept were its capability to operate under zero-gravity conditions, condense recovered water from a vapor-noncondensable gas mixture, and integrate with the catalytic system. Specific energy requirements were estimated for concepts meeting the primary requirements, and the concept most suitable for integration with the catalytic system was proposed. A three-man rate condenser capable of integration with the proposed system, condensing water vapor in presence of noncondensables and transferring the heat of condensation to feed urine was designed, fabricated, and tested. It was treated with steam/air mixtures at atmospheric and elevated pressures and integrated with an actual catalytic water recovery system. The condenser has a condensation efficiency exceeding 90% and heat transfer rate of approximately 85% of theoretical value at coolant temperature ranging from 7 to 80 deg C. Author

N83-25373# SRI International Corp., Menlo Park, Calif.
MAN-MACHINE COOPERATION FOR ACTION PLANNING Final Report
Ann Robinson and David Wilkins Nov. 1982 44 p refs
(Contract N00014-80-C-0300)
(AD-A124243) Avail: NTIS HC A03/MF A01 CSCL 05/8

This is the final report which investigated the cooperative process that enables a computer to assist a decisionmaker in planning and scheduling sequences of actions. This involved the development of a new system for planning and scheduling actions, along with a human-engineered package for defining multimodal man-machine interfaces (i.e., interactions using different human senses) that can be readily intermingled. In addition to work on these two aspects of the general problem, we produced a demonstration system applying the techniques devised in the course of the project to a task of relevance to the Navy. As a representative application, we selected the problem of planning and monitoring aircraft movement on board a carrier. GRA

N83-25374# Center for Policy Research, Inc., New York.
ORGANIZATIONAL CONTEXT OF HUMAN FACTORS Final Report, May - Nov. 1982
Charles Perrow Nov. 1982 68 p refs
(Contract N00014-82-C-0436; Grant NSF SES-80-14723)
(AD-A123435; Rept-221-2) Avail: NTIS HC A04/MF A01 CSCL 05/8

Organizational structure is analyzed for the impact it has on the human factors function in military and non-military organizations. The social structure's impact upon design engineers, the social role of the operator, and on the human factors engineer is detailed. The impact of equipment upon the operator and upon the social structure is detailed. Design philosophies are contrasted. The low status and power of the human factors engineer is contrasted to the status and power of the design engineer. Top management is seen as largely responsible for the low utilization of good human factors engineering. Recommendations for alleviating this include structural changes, accountability measures, documentation, and unobtrusive changes in socialization and culture in the organization. Examples from the literature and observations are provided.
Author (GRA)

N83-25375# Systems Research Labs., Inc., Dayton, Ohio.
SUBSIDIARY RADIO COMMUNICATIONS TASKS FOR WORKLOAD ASSESSMENT IN R&D SIMULATIONS. 2: TASK SENSITIVITY EVALUATION Technical Report, 1 Jul. 1980 - 2 Jan. 1982
Clark A. Shingledecker and Mark S. Crabtree Wright-Patterson AFB, Ohio Aerospace Medical Research Labs. Sep. 1982 44 p refs
(Contract F33615-79-C-0503; AF Proj. 7184)
(AD-A122545; AFAMRL-TR-82-57) Avail: NTIS HC A03/MF A01 CSCL 05/9

Because of the rapid growth of the technological complexity of modern aircraft and weapon systems, the assessment of operator workload at each stage of system design is of increasing importance. Secondary task measures of workload sensitive, reliable indicators of how hard the operator is working. One solution to these problems would be to employ secondary tasks which not only are an integral part of the operator's duties but also possess the properties of valid measurement tasks. The first in a series of such studies was performed and is described in this report. After extensive training on both single and dual tasks, six subjects were exposed to all possible combinations of eight communications tasks and two levels of single-axis tracking task difficulty. Dependent measures were the number of control losses on the tracking task and the accuracy and response times for the verbal and manual responses to the communication tasks. Results indicate that realistic radio activities can be used as secondary tasks to provide objective measures of workload. GRA

N83-25376# UNC Nuclear Industries, Inc., Richland, Wash.
A DIGITAL IMAGE PROCESSOR AS A HUMAN FACTORS ENGINEERING TOOL
J. A. Clayhold, S. A. Cook, T. P. Harrington, and H. Toffer 1982 5 p Presented at the Am. Nucl. Soc. Topical Conf., Charleston, S. Car., 18 Mar. 1982
(Contract DE-AC06-76RL-01857)
(DE82-015173; UNI-SA-88; CONF-820308-2) Avail: NTIS HC A02/MF A01

A technique for condensing a large amount of reactor operating information into a compact readily comprehensible display to assist the reactor operator with his tasks is described. Safe and efficient operation of a nuclear reactor requires assimilation by the operators of a large amount of information. This information which includes pressure, temperature and flow conditions, rod and valve positions, and power output is usually presented to the operator in analog form on meters, position indicators, or numerically on digital readouts. Compounding the data assimilation problem is the fact that the meters, readouts, and indicators are usually distributed throughout the control room. The plant parameter and instrumentation displays need to be visible, concise, and concentrated such that an operator can readily survey and understand the information and take proper action during a transient event. DOE

55 PLANETARY BIOLOGY

Includes exobiology; and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N83-25377*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CUMULATIVE REPORTS AND PUBLICATIONS THRU 31 DECEMBER 1982 Final Report
Apr. 1983 28 p refs
(Contracts NAS1-15810; NAS1-17070)
(NASA-CR-166116; NAS 1.26:166116) Avail: NTIS HC A03/MF A01 CSCL 12A

Institute for Computer Applications in Science and Engineering (ICASE) reports are documented. Author

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.

For components see *33 Electronics and Electrical Engineering.*

N83-25378* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MASSIVELY PARALLEL PROCESSOR COMPUTER Patent
Lai-Wo Fung, inventor (to NASA) (NAS-NRC, Washington, D.C.) Issued 12 Apr. 1983 15 p Filed 21 May 1979 Supersedes N79-27864 (17 - 18, p 2462) Sponsored by NASA
(NASA-Case-GSC-12223-1; US-Patent-4,380,046; US-Patent-Appl-SN-041143; US-Patent-Class-364-200) Avail: US Patent and Trademark Office CSCL 09B

An apparatus for processing multidimensional data with strong spatial characteristics, such as raw image data, characterized by a large number of parallel data streams in an ordered array is described. It comprises a large number (e.g., 16,384 in a 128 x 128 array) of parallel processing elements operating simultaneously and independently on single bit slices of a corresponding array of incoming data streams under control of a single set of instructions. Each of the processing elements comprises a bidirectional data bus in communication with a register for storing single bit slices together with a random access memory unit and associated circuitry, including a binary counter/shift register device, for performing logical and arithmetical computations on the bit slices, and an I/O unit for interfacing the bidirectional data bus with the data stream source. The massively parallel processor architecture enables very high speed processing of large amounts of ordered parallel data, including spatial translation by shifting or sliding of bits vertically or horizontally to neighboring processing elements.
Official Gazette of the U.S. Patent and Trademark Office

N83-25379*# New Technology, Inc., Huntsville, Ala.
CONCEPTUAL DESIGN OF A DATA REDUCTION SYSTEM Final Report
16 Mar. 1983 91 p refs
(Contract NAS8-32564)
(NASA-CR-170757; NAS 1.26:170757; FRI018) Avail: NTIS HC A05/MF A01 CSCL 09B

A telemetry data processing system was defined of the Data Reduction. Data reduction activities in support of the developmental flights of the Space Shuttle were used as references against which requirements are assessed in general terms. A conceptual system design believed to offer significant throughput for the anticipated types of data reduction activities is presented. The design identifies the use of a large, intermediate data store as a key element in a complex of high speed, single purpose processors, each of which performs predesignated, repetitive operations on either raw or partially processed data. The recommended approach to implement the design concept is to adopt an established interface standard and rely heavily on mature or promising technologies which are considered main stream of the integrated circuit industry. The design system concept, is believed to be implementable without reliance on exotic devices and/or operational procedures. Numerical methods were employed to examine the feasibility of digital discrimination of FDM composite signals, and of eliminating line frequency noises in data measurements. S.L.

N83-25380# Los Alamos Scientific Lab., N. Mex.
THE IMPACT OF SECURITY CONTROLS ON COMPUTING

PRODUCTIVITY
W. Jack Worlton Feb. 1982 17 p
(Contract W-7405-eng-36)
(LA-9214-MS) Avail: NTIS HC A02/MF A01

The tradeoffs that are necessary in the imposition of security controls in a computer network are reviewed. Although security controls may reduce security risks, they also may reduce computing productivity. Three kinds of productivity losses caused by security controls are described. Next, the effects of security controls on the three functional levels of computer networks are examined in the context of the Integrated Computer Network at the Los Alamos National Laboratory, and the security implications of innovations in computer network technology anticipated in the 1980s are reviewed. Finally, four generic regulatory errors are described. M.G.

N83-25381# Los Alamos Scientific Lab., N. Mex.
USING A BATCH PROCESSOR TO CREATE AN INTERACTIVE MENU-DRIVEN OPERATING SYSTEM
W. R. Melvin [1982] 10 p
(Contract W-7405-eng-36)
(LA-9205-MS) Avail: NTIS HC A02/MF A01

Techniques for converting a batch operating system into an interactive menu-driven system are described. The primary batch input file runs a FORTRAN program that displays a menu on the console. This program uses two I/O files: an input file containing current menu items and corresponding job control information and an output file that is subsequently submitted as a batch job, program that displays a current menu on the console. After the operator selects a program from the menu, the menu program looks up the appropriate job control information and transfers it to a secondary batch input file. Once the menu program terminates, the primary batch input file links to the secondary batch input file which runs the selected program. Furthermore, the last command in the secondary batch input file is always a link back to the primary batch input file. The menu program also permits adding new items to the menu as well as deleting existing items. Adding new items is the only process requiring a knowledge of the system job control language. M.G.

N83-25382# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
COMPUTATIONAL GEOMETRY ON A SYSTOLIC CHIP
Bernard Chazelle Apr. 1982 43 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A123362; CMU-CS-82-119) Avail: NTIS HC A03/MF A01 CSCL 09/2

This paper describes systolic algorithms for a number of geometric problems. Implementations yielding maximal throughput are given for solving dynamic versions of convex hull, inclusion, range and inverse range search, planar point location, intersection, triangulation, and closest-point problems. GRA

N83-25383# California Univ., Berkeley. Lawrence Berkeley Lab. Physics, Computer Science and Mathematics Div.
FILE MIGRATION IN DISTRIBUTED COMPUTER SYSTEMS Ph.D. Thesis
Juan M. Porcar Jul. 1982 159 p refs
(Contract DE-AC03-76SF-00098)
(DE82-021572; LBL-14763) Avail: NTIS HC A08/MF A01

The management of global (shared) files can have a big impact on the performance of distributed computer systems. The file referencing process and the development of algorithms to place and migrate files in distributed computer systems are discussed. DOE

N83-25384# Los Alamos Scientific Lab., N. Mex. Computing Div.
IMPLEMENTATION OF A FULLY RECONFIGURABLE MULTIMICROPROCESSOR
Vito A. Trujillo 1982 4 p refs Presented at the IEEE Conf. on Circuits and Computers, New York, 29 Sep. - 1 Oct. 1982
(Contract W-7405-eng-36)
(DE82-021769; LA-UR-82-2326; CONF-820908-3) Avail: NTIS HC A02/MF A01

The fully reconfigurable multimicroprocessor is an experimental configuration designed specifically as a research tool for implementing and evaluating parallel-processing algorithms on various multiprocessor architectures. Basically, the system is a shared-memory MIMD (multiple instruction-multiple data stream) machine that supports reconfiguration between processor and memory nodes to permit experimentation on architectures sharing common memory, networks of processors with only local memory, etc.DOE

N83-25385# Sandia Labs., Livermore, Calif.
FLOPPY-DISK SYSTEM FOR PUNCHED-TAPE READER EMULATION
J. E. Hopwood Aug. 1982 46 p refs
(Contract DE-AC04-76DP-00789)
(DE82-021126; SAND-82-8016) Avail: NTIS HC A03/MF A01

This report describes the application of minifloppy disk systems to numerically-controlled machine tools at Sandia, Livermore, as an alternative to time-consuming and unreliable punched-tape readers. DOE

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-25386# Oak Ridge National Lab., Tenn. Dept. of Computer Sciences.
OAK RIDGE NATIONAL LABORATORY FILTERING AND SMOOTHING PROGRAMS
D. H. Pike, G. W. Morrison, and B. M. Horwedel Mar. 1982 182 p
(Contract W-7405-eng-26)
(ORNL/CSD/TM-168) Avail: NTIS HC A09/MF A01

Documentation for various filtering and smoothing programs which have been developed are presented. The programs documented include: (1) A Kalman Filter and Linear Smoother algorithm designed for use on batch processing computer systems; (2) a Square-Root algorithm which produces the same output as the Kalman Filter and Linear Smoother but uses a different algorithm. This program is designed for batch processing systems; and (3) a Kalman Filter and Linear Smoother algorithm designed for use on minicomputers and/or real-time systems. Author

N83-25387# Oak Ridge National Lab., Tenn. Fusion Energy Div.
TEXT STRING PLOTTING ENHANCEMENTS FOR THE TEKTRONIX ADVANCED GRAPHING 2 SOFTWARE ON THE ORNL FUSION ENERGY DIVISION DECSYSTEM-10
W. H. Gray and K. A. Stewart Feb. 1982 28 p refs
(Contract W-7405-eng-26)
(ORNL/TM-8026) Avail: NTIS HC A03/MF A01

The user interface to a software library that extends the text string plotting capabilities of the Tektronix PLOT 10 Advanced Graphing II (AC2) software is documented. This software, called AGXTCS, permits easy plotting of text strings and labels at user specified positions and automatically determines a centered location for text strings associated with axis or graph labeling. The AGXTCS software must be used with the AG2 and Tektronix Terminal Control System (TCS) software to create display images on the screen of a Tektronix 4000 series storage tube terminal and/or to produce display images in TKF formatted graphics files for subsequent postprocessing on other graphics devices. The software capabilities, subroutine argument lists, and methods of accessing the AGXTCS software library are described. M.G.

N83-25388# Rochester Univ., N. Y. Dept. of Computer Science.
ON SHAPES
Dana H. Ballard and Daniel Sabbah Feb. 1982 16 p refs

(Grant PHS-2-R01-H1-21253-04)
(TR-92) Avail: NTIS HC A02/MF A01

An important problem in vision is to detect the presence of a known rigid, 3-d object. The general 3-d object recognition task can be thought of as building a description of the object that must have at least two parts: (1) the internal description of the object itself (with respect to an object centered frame); and (2) the transformation of the object centered frame to the viewer centered (image) frame. The reason for this decomposition is parsimony; different views of the object should have minimal impact on its description. This is achieved by factoring the object's description into two sets of parameters, one which is view independent (the object centered component) and one which is view varying (the viewing transformation). Often a description of the object is known beforehand and the task reduces to finding the object frame to viewer frame transformation. A method for handling this case is described: a known object is detected by finding changes in orientation, translation, and scale of the object from its canonical description. M.G.

N83-25389# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DEVELOPMENT OF TRANSLATIONAL IMAGE REGISTRATION TECHNIQUES [DESENVOLVIMENTO DE TECNICAS DE REGISTRO TRANSLACIONAL DE IMAGENS]
Pedro Paulo Balbi deOliveira Jan. 1983 96 p refs In PORTUGUESE; ENGLISH summary
(INPE-2634-RPE-427) Avail: NTIS HC A05/MF A01

Some general aspects of image processing are shown, defining what is a translational registration, and which is the aim of this work. The sequential similarity detection algorithm (SSDA) is discussed. Some ways of implementation are discussed and the threshold curves are obtained. The hierarchichal search technique as a new way to improve the efficiency of SSDA is discussed. Starting with some observations concerned with the computational aspect and the description of the tests done, conclusions are made. The results and the programs implemented are shown and discussed. The results of the tests done, the program print-outs and the flow diagram of SSDA program are shown. Author

N83-25390# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
MICROWAVE LABORATORY COMPUTER PROGRAM LIBRARY [BIBLIOTECA DE PROGRAMAS DE COMPUTADOR DO LABORATORIO DE MICROONDAS]
Helcio Aranha Dec. 1982 94 p refs In PORTUGUESE; ENGLISH summary
(INPE-2613-NTE/195) Avail: NTIS HC A05/MF A01

Several computer programs of INPE's microwave laboratory are discussed. The report is intended as an instruction manual for program users. Author

N83-25391# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
RESOURCE ALLOCATION: COPLAN/RAM SYSTEM USER'S MANUAL [ALOCACAO DE RECURSOS: MANUAL DE UTILIZACAO DO SISTEMA COPLAN/RAM]
Heloisa Galvao Villela Santos Borges Dec. 1982 132 p refs In PORTUGUESE; ENGLISH summary
(INPE-2614-NTE/196) Avail: NTIS HC A07/MF A01

A utilization manual of the interactive resource allocation system COPLAN/RAM is provided. All the data entry options of the software PROMIS/RAM package, used to implement the system, are totally explained. A completed example of the COPLAN/RAM utilization is presented. Author

N83-25392# General Electric Co., Philadelphia, Pa. Reentry Systems Operations.
COMPUTER SOFTWARE PROGRAM PLAN (CSPP)
Tom Barrett 13 Feb. 1983 75 p
(TIS-83-SDS-006) Avail: NTIS MF A01; HC Avail. General Electric $35.00

The development of software for customer or internal use is the result of merging many tasks into one. Some of these tasks are: Requirements/Analysis, Design, code, and test. Other tasks include software reliability, configuration control and software management. Deliverable software require a Computer Software Program Plan (CSPP) to be generated for the particular project. This document is a CSPP for any internal or deliverable software project. Extensions and exceptions for specific or unique project items could be included with the document to provide a workable CSPP. Author

N83-25393# Los Alamos Scientific Lab., N. Mex.
FITS: A FUNCTION-FITTING PROGRAM
Silvio J. Balestrini and Curtis G. Chezem [1982] 24 p refs
(Contract W-7405-eng-36)
(LA-9111-M) Avail: NTIS HC A02/MF A01

An iterating computer program (FITs) that adjusts the parameters of a function to fit a set of data points according to the least squares criterion and then list and plots the results is discussed. The function can be programmed or chosen from a library that is provided. The library can be expanded to include up to 99 functions. A general plotting routine, contained in the program but useful in its own right, is described. S.L.

N83-25394# California Univ., Berkeley. Lawrence Berkeley Lab. Information Methodology Research Project.
A SUMMARY OF THE RATFOR LANGUAGE, AN EXTENDED PORTABLE DIALECT CALLED REP, ITS STYLE AND FLAVOR, AND DETAILS OF ITS IMPLEMENTATION ON THE PDP-10
Joel Figen 10 Sep. 1981 74 p refs
(Contract W-7405-eng-48)
(LBL-13405) Avail: NTIS HC A04/MF A01

RATFOR (RATional FORtran) is a dialect of FORTRAN that allows structured programming and the use of simple macros. It is the language of the Software Tools package, and has proved significantly easier than FORTRAN to read, write, and understand. Although debugging is slightly harder in Ratfor than in FORTRAN, there is usually less of it to do, since RATFOR lends itself to better program design. RATFOR operates as a preprocessor to any existing FORTRAN system. It is relatively easy, using Ratfor, to write programs that are portable with little or no change to any environment that supports standard FORTRAN. REP (RATFOR Extended and Portable) is an extended version of RATFOR. It is fully upward compatible with the Addison-Wesley translator, though there are a few divergences from certain Unix and Software Tools User Group dialects. Author

N83-25395# California Univ., Livermore. Lawrence Livermore Lab.
GRAFL: A SIMPLIFIED GRAPHICS PACKAGE
B. McNamara and P. A. Willmann 15 Mar. 1982 36 p refs
(UCRL-53239) Avail: NTIS HC A03/MF A01

GRAFL is a library of subroutines designed to simplify plotting on a computer. With GRAFL, even the inexperienced programmer can benefit without resorting to voluminous manuals. These subroutines are written in GRAFLIB and incorporate many of that library's powerful features. GRAFL itself works on the CDC 7600 or the CRAY 1 and is almost twice as fast as TV8OLIB, but at a cost of 10 thousand to 20 thousand decimal words. The subroutines are identified and how to access and use them. A one page summary of GRAFL use and calling sequences, a test program including printouts of all the subroutines discussed in the text is appended and a set of output plots from the test program. Author

N83-25396# Naval Surface Weapons Center, Dahlgren, Va.
WHAT IS A SOFTWARE ENGINEERING ENVIRONMENT (SEE)? DESIRED CHARACTERISTICS Final Report
Walter P. Warner Dec. 1982 20 p refs
(AD-A124280; NSWC/TR-82-465) Avail: NTIS HC A02/MF A01 CSCL 09/2

The technology of developing software has made significant advances in the past several years. Some supervisors, however, still treat it as if it were a black art and have no notion of how much progress is being made in the development of computer programs. This can only mean that the software effort is being

performed by archaic methods and without the proper support tools. This report defines an environment for developing software. A proper supervisor in managing the development and supports the creation of maintainable computer programs. The various phases of software development are described briefly and the characteristics of a facility to support the development in each phase are indicated. GRA

N83-25397# Iowa Univ., Iowa City. Dept. of Statistics and Actuarial Science.
A FORTRAN PROGRAM FOR ISOTONIC REGRESSION IN TWO INDEPENDENT VARIABLES
Gordon Bril, Richard Dykstra, Carolyn Pillers, and Tim Robertson Jul. 1982 12 p refs
(Contract N00014-80-C-0321)
(AD-A123510; TR-86; Rept-11) Avail: NTIS HC A02/MF A01 CSCL 12/1

There are a number of algorithms for calculating the least squares isotonic regression function and six of these algorithms are discussed in Section 2, 3 of Barlow, Bartholomew, Bremner and Brunk (1972). The most widely used of these algorithms is the pool adjacent violators algorithm which is applicable only in the case of a simple linear ordering or an amalgamation of simple linear orderings. Cran (1980, Algorithm AS 149) gives a routine for computing the isotonic regression for the case of a simple linear ordering using the Up and Down Blocks algorithm. In many applications of isotonic regression we have more than one independent variable and the regression function is restricted to be monotone in each independent variable. GRA

N83-25398# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A LANGUAGE-ORIENTED INTERACTIVE PROGRAMMING ENVIRONMENT BASED ON COMPILATION TECHNOLOGY Ph.D. Thesis
Peter H. Feiler May 1982 177 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A123347; CMU-CS-82-117) Avail: NTIS HC A09/MF A01 CSCL 09/2

The purpose of the research in this dissertation is to study a new approach supporting a programmer with the construction and maintenance of programs. Our goal is to provide an integrated interactive programming environment that has some understanding of the programmer's tasks and actively participates in their solution. As a result it reduces the amount of time spent by a programmer at the possible expense of computer resources, which are readily available on the new generation of computers, the personal computers. This programming environment is known under the term Language-Oriented Interactive Programming Environment (LOIPE). GRA

N83-25399# F and K Group, New York, N.Y.
CEL-1 LIGHTING COMPUTER PROGRAM. PROGRAMMER'S GUIDE Final Report, Jan. 1980 - Sep. 1982
William B. Brackett (Applied Software Analysis, Boulder, Colo.) Jan. 1983 213 p refs
(Contract N68305-80-C-0012)
(AD-A124215; NCEL-CR-83.009) Avail: NTIS HC A10/MF A01 CSCL 09/2

The basic algorithms and program file structure of the CEL-1 (Conversion of Electric Lighting, Version 1.0) lighting computer program are documented. The CEL-1 computer program aids the illumination in designing energy efficient interior lighting systems. Lighting metrics which may be calculated include illuminance, equivalent sphere illumination, and visual comfort probability. Energy profiles resulting from lighting controls which respond to daylight can be evaluated using CEL-1. This programmer's guide is divided into seven sections: (1) Programs Structures; (2) Basic Techniques; (3) Main Program Descriptions; (4) Subprogram Descriptions; (5) Logical Unit Assignments; (6) Compiling the Programs; and (7) Source and Auxiliary Files. Author (GRA)

N83-25400# System Development Corp., Dayton, Ohio.
THE USER-ASSISTED AUTOMATED EXPERIMENTAL (TEST) DESIGN PROGRAM (AED): VERSION 2
Edwin G. Meyer, William H. Rickels, and Robert G. Mills (AMRL) Wright-Patterson AFB, Ohio AMRL Jan. 1983 189 p refs
(Contract F33615-79-C-0505; AF Proj. 7184)
(AD-A124303; AFAMRL-TR-82-100) Avail: NTIS HC A09/MF A01 CSCL 09/2

The large number of factors commonly encountered in simulation and live field test programs dictates that a large (and costly) experimental (test) program be run if the classical full factorial experimental design is employed. Through the use of a screening process involving a sequential design, efficient economical pilot studies can be conducted, leading to a reduction in the number of factors and the size of the experimental space. Fractional factorial designs are used in the pilot studies. The experimental data provide guidance to the experimenter in terms of removing nonsignificant factors and thus reducing the size of the experimental space. This report documents the second phase of design, development, and use of interactive computer program to aid in the development of fractional factorial experimental designs. Fractional factorial experiments are a special class of experimental procedures that allow the user to perform a smaller number of experiments than would be required in the usual experimental procedures and which maximize information return while minimizing the number of observations (tests) required. The overall experimental design philosophy is described and a brief introduction into the theory of experimental design is presented. The Appendix describes how the computer program was constructed and how it should be used. GRA

N83-25401# Massachusetts Inst. of Tech., Cambridge. Lab. for Information and Decision Systems.
ON THE COMPLEXITY OF DESIGNING DISTRIBUTED PROTOCOLS
Christos H. Papadimitriou and John Tsitsiklis Nov. 1982 10 p refs Submitted for publication Sponsored in part by NSF
(Contract N00014-77-C-0532; NR Proj. 041-519)
(AD-A123300; LIDS-P-1263) Avail: NTIS HC A02/MF A01 CSCL 09/4

We study the complexity of two problems of distributed computation and decision-making. We show that deciding whether two distant agents can arrive at compatible decisions without any communication one agent has three or more alternatives. We also show that minimizing the amount of communication necessary for the distributed computation of a function, when two distant computers receive each a part of the input, is NP-complete. This proves a conjecture due to A. Yao. Author (GRA)

N83-25402# SRI International Corp., Menlo Park, Calif.
JOVIAL PROGRAM VERIFIER RUGGED JOVIAL ENVIRONMENT Final Technical Report, 14 Nov. 1977 - 15 Nov. 1981
Bernard Elspas, Dwight F. Hare, Karl N. Levitt, and David L. Snyder Griffiss AFB, N.Y. RADC Oct. 1982 103 p refs
(Contract F30602-78-C-0031; AF Proj. 2532)
(AD-A123681; RADC-TR-82-277) Avail: NTIS HC A06/MF A01 CSCL 09/2

This report summarizes project work carried out at the Computer Science Laboratory of SRI International under Contract F30602-78-C-0031 with Rome Air Development Center during the period November 1977 November 1981. The project has been concerned with the development of a programming environment (Rugged Jovial Environment)--with verification tools as a principal component--for the specification, development, and formal verification of programs in JOVIAL-J73. The term verification here refers to proof of correctness with respect to formal specification by the method of Floyd assertions. The effort on this project has ranged from fairly abstract work on formal models of computation (in particular, regarding the semantics of JOVIAL constructs) to practical techniques for implementing these models. This has resulted in the development of a user-friendly system, written in INTERLISP, with the aid of which it is possible to verify JOVIAL software of significant complexity. In addition to our primary project

work, we developed several very usefull software tools of more general applicability. These tools are also described in the report.
GRA

N83-25403# Naval Underwater Systems Center, Newport, R.I. Launch and Handling Development Branch.
THEORETICAL CONSIDERATIONS AND USER'S MANUAL FOR A MODIFIED XYZ POTENTIAL FLOW PROGRAM FOR CALCULATING FIVE DEGREES-OF-FREEDOM VELOCITY POTENTIALS
Paul J. Lefebvre 15 Nov. 1982 58 p refs
(IR/IED Proj. A43105)
(AD-A123372; NUSC-TM-82-2076A) Avail: NTIS HC A04/MF A01 CSCL 09/2

The XYZ Potential Flow Computer Program (XYZPF) has been modified to include the calculation of perturbation and total velocity potentials for on-body and off-body points. The program's capabilities have also been extended from three to five degrees of freedom by incorporating calculations for two rotational degrees of freedom of the body (body rotation about its Y and Z axes). In addition to these modifications which increase the program's capabilities, the program, which was originally written for a CDC 6700 computer, was rewritten to fit on a PDP 11/34 computer. Test cases of a sphere and 2:1 ellipsoid were run and results compared well with known analytical solutions. GRA

N83-25404# Northeastern Univ., Boston, Mass. Electronics Research Lab.
A VAX ASSEMBLER FOR THE INTEL 8748 MICROCOMPUTER
James R. Manley, Jr., J. Spencer Rochefort, and Thomas P. Wheeler 14 Oct. 1982 34 p refs
(Contract F19628-80-C-0050; AF Proj. 7659)
(AD-A123378; AFGL-TR-82-0306; SR-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

This report details the program developed to use the VAX 11/780 Operating System to assemble programs written for the Intel 8748 microcomputer. Input programs are written in Intel MCS-48 mnemonics and the output listing gives the instructions and memory addresses in hexidecimal code. The assembly language itself is written in MACRO. Author (GRA)

N83-25405# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.
GRID-BASED LINE DRAWING QUANTIZATION M.S. Thesis
Keith Robert Jones Dec. 1982 88 p refs
(AD-A124692; AFIT/GE/EE/82D-41) Avail: NTIS HC A05/MF A01 CSCL 12/1

This paper documents a quantitative analysis of the performance of the generalized chain codes when used to quantize specific periodic waveforms. The analysis was performed using a software simulation of the various forms of the code to encode sine waves and circular waves. The performance of the coding schemes was measured in terms of the encoding rate and the area error in the quantization. Comparisons were made of the performance of codes for a particular function when the initial phase was altered. Comparisons were also made of the performance of the different forms of the codes used in quantizing the same function. Finally, the performance of the codes for the sine wave was compared with the performance of the same code for a circular wave having the same amplitude and period.
Author (GRA)

N83-25406# General Dynamics/Fort Worth, Tex. Data Systems Div.
LARGE SCALE SOFTWARE SYSTEM DESIGN OF THE AN/TYC-39 STORE AND FORWARD MESSAGE SWITCH USING THE ADA PROGRAMMING LANGUAGE, VOLUME 4 Final Report
9 Nov. 1982 157 p 4 Vol.
(Contract DAAK80-81-C-0108)
(AD-A123307) Avail: NTIS HC A08/MF A01 CSCL 09/2

An Ada oriented framework for the design and documentation of the U.S. Army TYC-39 store and forward message switch (military software) system is presented. This document contains a Requirements, Design, Ada Integrated Methodology, and Final Report section. A methodology to use Ada in specifying requirements, design, and the implementation of a system was developed. This methodology was used to redesign the TYC-39 message switch system. A selected software module was programmed after the redesign. Author (GRA)

N83-25407# General Dynamics/Fort Worth, Tex. Data Systems Div.
LARGE SCALE SOFTWARE SYSTEM DESIGN OF THE AN/TYC-39 STORE AND FORWARD MESSAGE SWITCH USING THE ADA PROGRAMMING LANGUAGE, VOLUME 1 Final Report
9 Nov. 1982 31 p 4 Vol.
(Contract DAAK80-81-C-0108)
(AD-A123304) Avail: NTIS HC A03/MF A01 CSCL 09/2

An Ada oriented framework for the design and documentation of the U.S. Army TYC-39 store and forward message switch (military software) system is presented. This document package contains a Requirements, Design, Ada Integrated Methodology, and Final Report section. A methodology to use Ada in specifying requirements, design, and the implementation of a system was developed. This methodology was used to redesign the TYC-39 message switch system. A selected software module was programmed after the redesign. Author (GRA)

N83-25408# General Dynamics/Fort Worth, Tex. Data Systems Div.
LARGE SCALE SOFTWARE SYSTEM DESIGN OF THE AN/TYC-39 STORE AND FORWARD MESSAGE SWITCH USING THE ADA PROGRAMMING LANGUAGE, VOLUME 2 Final Report
9 Nov. 1982 153 p refs 4 Vol.
(Contract DAAK80-81-C-0108)
(AD-A123305) Avail: NTIS HC A08/MF A01 CSCL 09/2

An Ada oriented framework for the design and documentation of the U.S. Army TYC-39 store and forward message switch(military software) system is presented. This document package contains a Requirements, Design, Ada Integrated Methodology, and Final Report section. A methodology to use Ada in specifying requirements, design, and the implementation of a system was developed. This methodology was used to redesign the TYC-39 message switch system. A selected software module was programmed after the redesign. Author (GRA)

N83-25409# General Dynamics/Fort Worth, Tex. Data Systems Div.
LARGE SCALE SOFTWARE SYSTEM DESIGN OF THE AN/TYC-39 STORE AND FORWARD MESSAGE SWITCH USING THE ADA PROGRAMMING LANGUAGE, VOLUME 3 Final Report
9 Nov. 1982 193 p 4 Vol.
(Contract DAAK80-81-C-0108)
(AD-A123306) Avail: NTIS HC A09/MF A01 CSCL 09/2

An Ada oriented framework for the design and documentation of the U.S. Army TYC-39 store and forward message switch (military software) system is presented. This document package contains a Requirements, Design, Ada Integrated Methodology, and Final Report section. A methodology to use Ada in specifying requirements, design, and the implementation of a system was developed. This methodology was used to redesign the TYC-39 message switch system. A selected software module was programmed after the redesign. Author (GRA)

N83-25410# Control Data Corp., Shrewsbury, N.J. Government Systems Div.
LARGE SCALE SOFTWARE SYSTEM DESIGN OF THE MISSILE MINDER AN/TSQ-73 USING THE ADA PROGRAMMING LANGUAGE Final Report
9 Nov. 1982 553 p refs
(Contract DAAK80-81-C-0107)
(AD-A123308) Avail: NTIS HC A24/MF A01 CSCL 09/2

This report documents the research and development effort for the design and documentation of the Missile Minder System AN/TSQ-73 using Ada as a program design language. Issues analyzed include adequacy of design methods, system design issues, and the career types required for the system design. Author (GRA)

N83-25411# Naval Research Lab., Washington, D. C.
INTERFACE SPECIFICATIONS FOR THE SCR (A-7E) EXTENDED COMPUTER MODULE
D. L. Parnas, D. M. Weiss, P. C. Clements, and K. H. Britton 6 Jan. 1983 117 p refs
(XF21242101)
(AD-A123566; NRL-MR-4843) Avail: NTIS HC A06/MF A01 CSCL 09/2

This document describes the programmer interface to a computing machine partially implemented in software. The Extended Computer is part of NRL's Software Cost Reduction (SCR) project, to demonstrate the feasibility of applying advanced software engineering techniques to complex real-time systems in order to simplify maintenance. The Extended Computer allows code portability among avionics computers by providing extensible addressing, uniform i/o and data access, representation-independent data types, uniform event signalling, a standard subprogram invocation mechanism, and parallel process capability. The purpose of the Extended Computer is to allow the remainder of the software to remain unchanged when the host computer is changed or replaced. GRA

N83-25412# Texas Instruments, Inc., Lewisville. Image Processing Systems Dept.
PROGRAMMABLE IMAGE PROCESSING ELEMENT (PIPE) Final Technical Report, 15 Dec. 1980 - 15 Jun. 1982
W. L. Eversole, J. F. Salzman, and F. V. Taylor Wright-Patterson AFB, Ohio AFWAL Oct. 1982 85 p
(Contract F33615-80-C-1180; AF Proj. 6096)
(AD-A123443; AFWAL-TR-82-1121) Avail: NTIS HC A05/MF A01 CSCL 09/2

The objective of this 18-month exploratory development effort was the fabrication and testing of the Programmable Image Processing Element (PIPE) Large-Scale Integrated Circuits developed under the Phase I contract and the design and fabrications of a brassboard to demonstrate the versality of the PIPE LSIC. Two phases of IC processing were required because minor layout errors were discovered iri the first-pass ICs, and the redesign, photomask generation, processing, and testing steps were repeated. The second-pass ICs were 100-percent functional and packaged in 64-pin dual in-line packages (DIPs) for use in the brassboard. A flexible brassboard operating in or near real-time was developed to demonstrate the PIPE LSIC. Although simple, the brassboard operates the PIPE LSIC in both its serial and parallel modes and demonstrates its processing of vector/transforms and neighborhood operators. Images composed of 512 by 512 8-bit pixels are formed in a frame buffer and processed at frame rates determined by the PIPE LSIC throughput, buffer memory speed, brassboard architecture, and the algorithm being computed. Eight PIPE LSICs are used in the brassboard. For the 3 X 3 differential edge detectors, four PIPE LSICs calculate the horizontal response while the other four PIPE LSICs calculate the vertical response. Author (GRA)

N83-25413*# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
A FORTRAN PROGRAM FOR THE COMPUTATION OF GRAVIMETRIC QUANTITIES FROM HIGH DEGREE SPHERICAL HARMONIC EXPANSIONS
Richard H. Rapp Hanscom AFB, Mass. AFGL Sep. 1982 26 p refs
(Contract F19628-82-K-0022; AF Proj. 2309)
(AD-A123406; DGS-334; AFGL-TR-82-0272; SR-1) Avail: NTIS HC A03/MF A01 CSCL 09/2

The computer program described in this report calculates the height anomaly, gravity anomaly, gravity disturbance, and the two components of the deflection of the vertical using fully normalized potential coefficients of a spherical harmonic expansion. The program is designed to calculate these quantities on a point to point basis although certain calculations are not repeated if the latitude of the point does not change. The point input consists of the geodetic latitude, longitude, and height above the reference ellipsoid. Expansions up to degree 180 have been tested with the program. The report first describes the theory to be implemented. The program is described with a set of results for five sample points computed with three different potential coefficient fields to degree 180. The computer time for a single point is 0.46 seconds per point on the Amdahl 470 V/8. GRA

N83-25414# Syracuse Univ., N. Y. Dept. of Industrial Engineering and Operations Research.
SOFTWARE RELIABILITY MODELLING AND ESTIMATION TECHNIQUES Final Technical Report, Oct. 1978 - Oct. 1981
Amrit L. Goel Griffiss AFB, N.Y. RADC Oct. 1982 335 p refs
(Contract F30602-78-C-0351; AF Proj. 5581)
(AD-A123421; RADC-TR-82-263) Avail: NTIS HC A15/MF A01 CSCL 09/2

This report presents the results of the software reliability modelling and estimation research. Two new models of very general applicability are introduced and the necessary mathematical and practical details are developed in this report. A new methodology for determining when to stop testing and start using software is described and developed. A new model for analyzing the operational performance of a combined hardware-software system is reported even though it was not a part of the original research plan. GRA

N83-25415# Illinois Univ., Urbana. Coordinated Science Lab.
NATURAL LANGUAGE PROCESSING USING SPREADING ACTIVATION AND LATERAL INHIBITION
Jordan Pollack Aug. 1982 13 p refs
(Contract N00014-75-C-0612)
(AD-A123427; WP-35) Avail: NTIS HC A02/MF A01 CSCL 05/7

The knowledge needed to process natural language comes from many sources. While the knowledge itself may be broken up modularly, into knowledge of syntax, semantics, etc., the actual processing should be completely integrated. This form of processing is not easily amenable to the type of processing done by serial von Neumann computers. This work in progress is an investigation of the use of a highly parallel, spreading activation and lateral inhibition network as a mechanism for integrated natural language processing. Author (GRA)

N83-25416# Department of Defense, Washington, D. C.
REPORT OF THE DEPARTMENT OF DEFENSE JOINT SERVICE TASK FORCE ON SOFTWARE PROBLEMS Report, 23 Apr. - 30 Jul. 1982
30 Jul. 1982 240 p
(AD-A123449) Avail: NTIS HC A11/MF A01 CSCL 09/2

The opportunities and problems posed by computer software embedded in DoD weapon systems were investigated by a joint Service task force. Existing studies were combined with the observations of DoD project managers by the software experienced task force members. Author (GRA)

N83-25417# Army Industrial Base Engineering Activity, Rock Island, Ill.
CAM HIGHLIGHTS, FY 82 Final Biennial Report
Thethel N. Locke Nov. 1982 113 p
(AD-A123395) Avail: NTIS HC A06/MF A01 CSCL 13/8

This Document contains summaries of 39 Army Computer Aided Manufacturing (CAM) efforts that are either completed or on-going. The Army CAM Program funds efforts through manufacturing technology, facilities or major systems contracts. Significant information contained in this document was obtained from various management documents submitted to IBEA during the life cycle of the efforts. DARCOM Subordinate Major Commands, Installations, Activities, and Program Offices are the sources for this

management data. The summaries highlight the integration of computers in manufacturing and are organized into eleven sections for this document. These eleven sections correspond to system technology areas which are listed with their numerical classification number. GRA

N83-25418# Hibbitt, Karlsson and Sorensen, Providence, R.I.
ABAQUS-EPGEN: A GENERAL-PURPOSE FINITE-ELEMENT CODE. VOLUME 1: USER'S MANUAL
H. D. Hibbitt, B. I. Karlsson, and E. P. Sorensen Oct. 1982 611 p
(EPRI Proj. 964-5; EPRI Proj. 1550-1)
(DE83-900754; EPRI-NP-2709-CCM-Vol-1) Avail: NTIS HC A99/MF A01

This document is the User's Manual for ABAQUS/EPGEN, a general purpose finite element computer program, designed specifically to serve advanced structural analysis needs. The program contains very general libraries of elements, materials and analysis procedures, and is highly modular, so that complex combinations of features can be put together to model physical problems.The program is aimed at production analysis needs, and for this purpose aspects such as ease-of-use, reliability, flexibility and efficiency have received maximum attention. The input language is designed to make it straightforward to describe complicated models; the analysis procedures are highly automated with the program choosing time or load increments based on user supplied tolerances and controls; and the program offers a wide range of post-processing options for display of the analysis results. DOE

N83-25419# Science Applications, Inc., Palo Alto, Calif.
PLUNGE: A COMPUTER PROGRAM FOR TRANSIENT-EVENT ANALYSIS Interim Report
B. Poehlman Jan. 1982 41 p Sponsored by EPRI
(EPRI Proj. 1233-1)
(DE82-902098; EPRI-NP-2229) Avail: NTIS HC A03/MF A01

PLUNGE is a computer program which performs various searches on a data base of events which lead to reactor fast shutdowns (scrams). The output is in the form of tables which show the frequency of the events. This program is an updated version of SEARCH, which was used to generate the tables shown in the appendices in EPRI NP-801. DOE

N83-25420# Los Alamos Scientific Lab., N. Mex.
SUBMAP MANUAL: SUBROUTINE MAPPING PROGRAM
Peter A. Berardo and Barbara C. Swenson Jul. 1982 20 p
(Contract W-7405-eng-36)
(DE82-021836; LA-9353-M) Avail: NTIS HC A02/MF A01

SUBMAP is a FORTRAN computer program for analyzing FORTRAN source files. It identifies the names and types of routines, and the names and references for common blocks. A tree type listing can be generated showing the hierarchy and sequence of references starting and ending with any routine. Many other analysis options exist to summarize or extract cross reference information, extract source code for selected routines, or reorder the source file in alphabetical or call order. SUBMAP can be used interactively or in batch mode with dynamic selection of source, input, output, and save files. DOE

N83-25421# Argonne National Lab., Ill.
SOFTWARE FOR ESTIMATING SPARSE JACOBIAN MATRICES
Thomas F. Coleman and Jorge J. More Jul. 1982 59 p
(Contract W-31-109-eng-38)
(DE82-021234; ANL-82-37) Avail: NTIS HC A04/MF A01

In many nonlinear problems it is necessary to estimate the Jacobian matrix of a nonlinear mapping F. In large scale problems the Jacobian of F is usually sparse, and then estimation by differences is attractive because the number of differences can be small compared to the dimension of the problem. For example, if the Jacobian matrix is banded then the number of differences needed to estimate the Jacobian matrix is, at most, the width of the band. A set of subroutines whose purpose is to estimate the Jacobian matrix of a mapping F with the least possible number of function evaluations is described. DOE

N83-25422# Illinois Univ., Urbana. Dept. of Computer Science.
COMPUTATIONAL METHODS AND SOFTWARE FOR ODES AND THEIR APPLICATIONS Annual Progress Report, 16 Nov. 1981 - 15 Nov. 1982
1982 12 p refs
(Contract DE-AC02-76ER-02383)
(DE82-020803; DOE/ER-02383/0085; COO-2382-0085) Avail: NTIS HC A02/MF A01

Tasks in the development of programs for the solution at ordinary differential equations are described and work performed is described. DOE

N83-25423# Sandia Labs., Albuquerque, N. Mex.
SOME REMARKS ON THE HERLESTAM-JOHANNESSON ALGORITHM FOR COMPUTING LOGARITHMS OVER GF(2P)
E. F. Brickell and J. H. Moore 1982 5 p refs Presented at the Conf. on Cyrptosys., Santa Barbara, Calif., 23 Aug. 1982
(Contract DE-AC04-76DP-00789)
(DE82-020628; SAND-82-1908C; CONF-820852-2) Avail: NTIS HC A02/MF A01

At the 1981 IEEE Symposium on Information Theory, T. Herlestam and R. Johannesson presented a heurestic method for computing logarithms over GF(2(p)). They reported computing logarithms over GF(2(31)) with surprisingly few iterations and claimed that the running time of their algorithm was polynomial in p. If this were true, the algorithm could be used to cryptanalyze the Pohlig-Hellman cryptosystem. The system operates in GF(2 (127)). However, the algorithm was not implemented for GF(2(p)) for $p > 31$ because it would require multiple precision arithmetic. Consequently attempts to evaluate the possible threat to the Pohlig-Hellman cryptosystem have centered on modeling the algorithm so that some predictions could be made analytically about the number of iterations required to find logarithms over GF(2/sup(p)) for $p > 31$. DOE

N83-25424# Los Alamos Scientific Lab., N. Mex.
EXPERIENCES WITH DISTRIBUTING GRAPHIC SOFTWARE BETWEEN PROCESSORS
Griffith Hamlin and James E. George 1982 8 p refs Presented at the 3rd Intern. Conf. on Distributed Computing Systems, Miami, Fla., 18-22 Oct. 1982
(Contract W-7405-eng-36)
(DE82-019559; LA-UR-82-2059; CONF-821002-2) Avail: NTIS HC A02/MF A01

Software to aid the distribution and coordination of tasks between different processors was developed to distribute applications written in FORTRAN. This development led to the discovery of problems unique to FORTRAN and to interesting practical solutions. Two graphical applications were distributed to a variety of machines and machine pairs: CDC 7600-LSI/11, Cray-LSI/11, VAX 11/780, and Apollo. These distributions pointed out several parameters such as the use of FORTRAN Common, communication parameters, and processing capabilities that can affect the successful distribution of applications. DOE

N83-25425# California Univ., Livermore. Lawrence Livermore Lab.
DATA ANALYSIS USING MULTIPLE FILTERS
K. K. Nakanishi and N. C. Burr 25 Aug. 1982 17 p refs
(Contract W-7405-eng-48)
(DE82-021948; UCID-19505) Avail: NTIS HC A02/MF A01

Several progams were written for the OCTOPUS and LLNL Seismic Observatory's PRIME computer system. These programs are used to compute spectral amplitude as a function of time for various frequency bands, and to display the results using either contour levels or color graphics. DOE

N83-25426# Sandia Labs., Albuquerque, N. Mex.
A SYSTEM FOR DEVELOPING HP41CV HAND-HELD CALCULATOR PROGRAMS ON AN HP9845 DESKTOP COMPUTER

Harold D. Pruett Oct. 1982 14 p
(Contract DE-AC04-76DP-00789)
(DE83-005360; SAND-82-2175) Avail: NTIS HC A02/MF A01

A software development system utilizing the HP9845 desktop computer to facilitate programming of the HP41 hand-held calculator is described and discussed. This system overcomes the two primary deficiencies involved in developing long programs for the HP41, namely, the lack of a typewriter keyboard on the HP41 and the inability to include comments in program lines. DOE

N83-25427# Bendix Corp., Kansas City, Mo. Operations Dept.
BENDIX CAD-CAM SITE PLAN
M. L. Smith Dec. 1982 45 p
(Contract DE-AC04-76DP-00613)
(DE83-005327; BDX-613-2886) Avail: NTIS HC A03/MF A01

The development and integration of interactive graphics systems, factory data management systems, robotics, direct numerical control, automated inspection, factory automation, and shared data bases to achieve significant plant wide gains in productivity is analyzed. A summary of planning proposals and rationale is presented in the following paragraphs. Interactive Graphics System (TGS) capability presently consists of two Applicon CAD systems and the CD-2000 software program processing on a time shared CYBER 174 computer and a dedicated CYBER 173. Proposed plans include phased procurement through FY 85 of additional computers and sufficient graphics terminals to support projected needs in drafting, tool/gage design, N/C programming, and process engineering. Planned procurement of additional computer equipment in FY 86 and FY 87 will provide the capacity necessary for a comprehensive graphics data base management system, computer aided process planning graphics, and special graphics requirements in facilities and test equipment design. DOE

62 COMPUTER SYSTEMS

Includes computer networks.

N83-25428# California Univ., Livermore. Lawrence Livermore Lab.
A METHODOLOGY FOR ASSESSING THE SECURITY RISKS ASSOCIATED WITH COMPUTER SITES AND NETWORKS. PART 1: DEVELOPMENT OF A FORMAL QUESTIONNAIRE FOR COLLECTING SECURITY INFORMATION
G. C. Corynen 23 Jun. 1982 81 p refs
(UCRL-53292-Pt-1) Avail: NTIS HC A05/MF A01

A new methodology has been developed for the assessment of security risks associated with the operation of computer complexes. It is designed to assist computer security managers and their risk assessment teams in obtaining an overall risk figure for their computer site or network. This report emphasizes the determination of harms to computation assets due to various natural and human threats. Natural threats include earthquakes, floods, fires, and other disasters. Human threats include intentional harms such as asset theft or data modification, and unintentional harms such as errors and omissions. A group of individuals assisting each other in reaching a collective goal is also discussed. In addition to asset damages, the effects of damaging the countermeasures protecting the assets, or the supports which allow the operation of the assets, can be determined. The effects of damage to countermeasures which protect other countermeasures or supports can be analyzed also. Propagation of the effects of threats through the computer complex involves time, and often a competition for time between a threat and a security system arises. Such timing issues can also be treated. The flexibility of the methodology allows the analysis of a computer complex at any level of detail. A coarse analysis could be conducted for exploratory or guidance purposes, and a detailed analysis conducted for definitive purposes. This generally of approach allows risk analyses in other areas such as safety, safeguards, reliability, privacy, and military engagements. B.W.

N83-25429# California Univ., Livermore. Lawrence Livermore Lab. Computation Dept.
MINIMIZATION OF PATH LENGTHS IN SINGLE STAGE CONNECTION NETWORKS
J. E. Wirsching and T. Kishi 1982 12 p refs Presented at the 3rd Intern. Conf. on Distributed Computing Systems, Miami, Fla., 18-22 Oct. 1982
(Contract W-7405-eng-48)
(DE82-020174; UCRL-87795; CONF-821002-3) Avail: NTIS HC A02/MF A01

The question is analyzed as to whether various connectivities within multiple-stage or single-stage connection networks (CN) are equivalent. Conditions under which the CN's are configured and exercised are precisely defined. Members of the universe of single-stage CN's are discovered to be non-equivalent and reasons for this are examined. Rules are developed for minimization of path lengths, and measurements are made for a number of different connectivities in both the static and dynamic states. Multiple-stage CN's are all found to be equivalent under random request loading and random arbitration. A comparison of the two types of CN's is attempted. DOE

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

No abstracts in this category.

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-25430*# Mississippi State Univ., Mississippi State. Dept. of Aerospace Engineering.
TRANSFORMATION OF TWO AND THREE-DIMENSIONAL REGIONS BY ELLIPTIC SYSTEMS Semiannual Status Report, 15 Nov. 1982 - 14 May 1983
Joe F. Thompson and C. Wayne Mastin 16 May 1983 34 p refs
(Grant NsG-1577)
(NASA-CR-170310; NAS 1.26:170310) Avail: NTIS HC A03/MF A01 CSCL 12A

Finite difference methods for composite grids were analyzed. It was observed that linear interpolation between grids would suffice only where low order accuracy was required. In the context of fluid flow, this would be in regions where the flow was essentially free stream. Higher order interpolation schemes were also investigated. The well known quadratic and cubic interpolating polynomials would increase the formal accuracy of the overall numerical algorithm. However, it can also be shown that the stability of the algorithm may be adversely affected. Further numerical results are needed in order to assess the nature of this instability induced by the interpolation procedure. Finally, error analysis and the order of difference expressions on general curvilinear coordinates are discussed. M.G.

N83-25431*# Carnegie-Mellon Univ., Pittsburgh, Pa.
A COMPARATIVE STUDY OF FINITE ELEMENT AND FINITE DIFFERENCE METHODS FOR CAUCHY-RIEMANN TYPE EQUATIONS Final Report
George J. Fix and Milton E. Rose (NASA, Langley Research Center) Mar. 1983 25 p refs
(Contracts NAS1-17070; NAS1-17130)
(NASA-CR-166113; NAS 1.26:166113; Rept-83-4) Avail: NTIS HC A02/MF A01 CSCL 12A

A least squares formulation of the system divu = rho, curlu = zeta is surveyed from the viewpoint of both finite element and finite difference methods. Closely related arguments are shown to establish convergence estimates. Author

N83-25432*# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mathematical Sciences.
NUMERICAL METHODS FOR STIFF SYSTEMS OF TWO-POINT BOUNDARY VALUE PROBLEMS Final Report
Joseph E. Flaherty and Robert E. OMalley, Jr. Hampton, Va. NASA. Langley Research Center Apr. 1983 46 p refs Prepared in cooperation with Inst. for Computer Applications in Science and Engineering, NASA. Langley Research Center, Hampton, Va.
(Contracts NAS1-15810; NAS1-17070; N00014-81-K-056; DAAG29-82-K-0197; Grant AF-AFOSR-0192-80)
(NASA-CR-166115; NAS 1.26:166115; Rept-83-6) Avail: NTIS HC A03/MF A01 CSCL 12A

Numerical procedures are developed for constructing asymptotic solutions of certain nonlinear singularly perturbed vector two-point boundary value problems having boundary layers at one or both endpoints. The asymptotic approximations are generated numerically and can either be used as is or to furnish a general purpose two-point boundary value code with an initial approximation and the nonuniform computational mesh needed for such problems. The procedures are applied to a model problem that has multiple solutions and to problems describing the deformation of thin nonlinear elastic beam that is resting on an elastic foundation. Author

N83-25433*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NATURAL CONVECTION IN AN ENCLOSED CAVITY Final Report
Timothy N. Phillips Feb. 1983 27 p refs
(Contract NAS1-170070)
(NASA-CR-166112; NAS 1.26:166112; Rept-83-2) Avail: NTIS HC A03/MF A01 CSCL 12A

The problem of buoyancy driven flow in a vertical, rectangular cavity whose vertical sides are at different temperatures and whose horizontal sides are insulated is addressed. An application of the dynamic A.D.I. method to obtain numerical solutions to this problem is described. For large non-dimensional temperature differences characterized by the Rayleigh number the flow patterns develop strong boundary layers. These boundary layers are resolved by applying the D.A.D.I. method to the discretization of this problem on a non-uniform grid. Author

N83-25434# Oak Ridge National Lab., Tenn. Computer Sciences Div.
SIMULATION ANALYSIS OF SOME OUTLIER DETECTION METHODS
D. J. Downing and J. E. Pierce Dec. 1981 63 p refs
(Contract W-7405-eng-26)
(ORNL/CSO/TM-143) Avail: NTIS HC A04/MF A01

Bivariate outlier detection techniques are presented. The techniques employed are derived from three different areas: (1) the influence function for the correlation coefficient; (2) regression diagnostics; and (3) principal component tests. The techniques are described briefly and references for further study are given. Simulations under the null case of no outliers yield percentage points of the sampling distribution of the statistics involved for test of hypothesis purposes. Additional simulations were performed modeling different types of outlier situations to enable comparison of the techniques. A computer code to calculate the statistics and present results is also included. M.G.

N83-25435# Oak Ridge National Lab., Tenn. Computer Sciences Div.
A MUSHY ZONE MODEL WITH AN EXACT SOLUTION
A. D. Solomon, D. G. Wilson, and V. Alexiades Apr. 1982 21 p refs
(Contract W-7405-eng-26)
(ORNL/CSD-91) Avail: NTIS HC A02/MF A01

A very simple model of a mushy zone which admits of an explicit solution is proposed. It is the only instance where an actual observation of the mushy zone width and structure is used as a partial basis for the model definition. The model rests upon two unknown parameters. The first determines the relation between the equilibrium temperature gradient and the mushy zone width. The second depends upon the dendritic structure in the mushy zone, and is related to the solid fraction. Both can be estimated from experiments. The discussion is limited to defining the model, presenting its closed form solution, and giving tables from which the solution can be found explicitly. It is shown that in most cases the predicted mushy zone is of very negligible importance. M.G.

N83-25436# Queensland Univ., Brisbane (Australia). Dept. of Civil Engineering.
THE FINITE INTEGRAL METHOD IN DYNAMIC ANALYSIS: A REAPPRAISAL
P. Swannell Aug. 1981 28 p refs
(RR-CE-27) Avail: NTIS HC A03/MF A01

The Finite Integral Method (F.I.M.) as a means of solving the equilibrium equations which arise in the dynamic analysis of structures was investigated. An improvement of the method with special reference to its place in relation to some other, better known, direct integration schemes was presented. The presentation is designed for people, like the writer, who do not have a background of experience in numerical methods of analysis but who have a curiosity about where their particular work fits in. Author

N83-25437# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
IMAGE REGISTRATION BY SEQUENTIAL TESTS OF HYPOTHESES: GAUSSIAN AND BINOMIAL TECHNIQUES
Nelson D. A. Mascarenhas and Jose A. G. Pereira Apr. 1983 12 p refs Presented at the 17th Intern. Symp. on Remote Sensing of Environment, Ann Arbor, Mich., 9-13 May 1983
(INPE-2710-PRE/298) Avail: NTIS HC A02/MF A01

The problem of translational image registration has received considerable attention in the area of image processing and recognition as applied to remote sensing. The main methods that have been proposed are based either on correlation techniques or on algorithms of the Type SSDA (Sequential Similarity Detection Algorithm), where the error between the two images is accumulated and a threshold sequence is selected, such that the rejection of a candidate position can be done at an early stage. A new approach to image registration problems is proposed, based on the theory of sequential test of hypotheses. This leads to the development of two different methods: the first one is based on the Gaussian assumption and uses the fact that the variance of the error between two images to be registered tend to be low on the registration point. The second uses binary images derived from the original ones. The statistical model for the resulting accumulated error is a binomial distribution and the registration position is characterized by a low probability of the binary error being one. In both methods two sequences of thresholds are employed: one leading to the rejection of the point and the other one to the eventual acceptance of it. Experimental results with both methods are presented. Author

N83-25438*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THEORETICAL METHOD FOR CALCULATING RELATIVE JOINT GEOMETRY OF ASSEMBLED ROBOT ARMS
L. Keith Barker and Mary C. Moore May 1983 25 p refs
(NASA-TP-2155; L-15562; NAS 1.60:2155) Avail: NTIS HC A02/MF A01 CSCL 12A

Equations are developed to extract the relative joint parameters of an assembled robot arm. Specifically, the Denavit-Hartenberg parameters, which completely characterize the relative joint geometry, are calculated. These parameters are needed to control the hand of the robot arm by resolved rate. As an example, the parameter extraction equations are used with perfect simulated data (no measurement noise) obtained from a mathematical model

of a six-degree-of-freedom robot arm. For an actual application, measurement data needed to estimate the relative joint parameters can be generated by moving a robot arm to different positions, measuring the location of the hand (or other extension) in base coordinates, and recording the corresponding joint angles. Author

N83-25439# Wisconsin Univ., Madison. Mathematics Research Center.
EXISTENCE OF FORCED OSCILLATIONS FOR SOME NONLINEAR DIFFERENTIAL EQUATIONS Technical Summary Report
Abbas Bahri (CNRS) and Henri Berestycki (CNRS) Nov. 1982 56 p refs
(Contract DAAG29-80-C-0041)
(AD-A124372; MRC-TSR-2446) Avail: NTIS HC A04/MF A01 CSCL 12/11

This article studies the existence of T-periodic solutions for systems of nonlinear second order ordinary differential equations. Assuming function V to be superquadratic, it is shown that this system possesses infinitely many T-periodic solutions. The proof of this result rests on showing that certain homotopy groups of level sets of the functional associated with the system are not trivial. Some more general results concerning systems of another type are also presented. GRA

N83-25440# Wisconsin Univ., Madison. Mathematics Research Center.
INITIAL BOUNDARY VALUE PROBLEMS FOR THE EQUATIONS OF MOTION OF COMPRESSIBLE VISCOUS AND HEAT-CONDUCTIVE FLUIDS Technical Summary Report
Akitaka Matsumura and Takaaki Nishida Sep. 1982 33 p refs
(Contract DAAG29-80-C-0041)
(AD-A124382; MRC-TSR-2430) Avail: NTIS HC A03/MF A01 CSCL 12/1

The equations of motion of compressible viscous and heat-conductive fluids are investigated for initial boundary value problems on the half space and on the exterior domain of any bounded region. The global solution in time is proved to exist uniquely and approach the stationary state as it approaches infinity, provided the prescribed initial data and the external force are sufficiently small. Author (GRA)

N83-25441# Wisconsin Univ., Madison. Mathematics Research Center.
HIGHLIGHTS OF THE HISTORY OF THE LAMBDA-CALCULUS Technical Summary Report
J. Barkley Rosser Oct. 1982 31 p refs
(Contract DAAG29-80-C-0041)
(AD-A124383; MRC-TSR-2441) Avail: NTIS HC A03/MF A01 CSCL 12/1

This is an account of not only the lambda-calculus but of its close relative, the combinatory calculus. It begins with an introductory survey, so that no previous knowledge is required. It is explained why these are of such importance for computer software. The account is brought up to the present time. It includes the shortest and simplest proof of the Church-Rosser theorem, which is not yet published and appeared in a limited printing in August 1982. It includes a model of the combinatory calculus, also not yet published but available in 1982 in a limited printing. An introduction is given to some revolutionary new developments of the combinatory calculus for programming computers.
Author (GRA)

N83-25442# Stanford Univ., Calif. Systems Optimization Lab.
SPARSE MATRIX METHODS IN OPTIMIZATION
Phillip E. Gill, Walter Murray, Michael Saunders, and Margaret H. Wright Dec. 1982 34 p refs
(Contracts N00014-75-C-0267; DAAG29-81-K-0156; DE-AC03-76SF-00326; DE-AT03-76ER-72018; DAAG29-79-C-0110; Grants NSF MCS-79-26009; NSF ECS-80-12974)
(AD-A124397; SU-SOL-82-17; ARO-18424.9-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

Optimization algorithms typically require the solution of many systems of linear equations B sub Y sub = b sub. When large numbers of variables or constraints are present, these linear systems could account for much of the total computation time. Both direct and iterative equation solvers are needed in practice. Unfortunately, most of the off-the shelf solvers are designed for single systems, whereas optimization problems give rise to hundreds or thousands of systems. To avoid refactorization, or to speed the convergence of an iterative method, it is essential to note that B sub is related to B sub - 1. The authors review various sparse matrices that arise in optimization, and discuss compromises that are currently being made in dealing with them. Since significant advances continue to be made with single-system solvers they give special attention to methods that allow such solvers to be used repeatedly on a sequence of modified systems (e.g., the product-form update; use of the Schur complement). The speed of factorizing a matrix then becomes relatively less important than the efficiency of subsequent solves with very many right-hand sides. At the same time it is hoped that future improvements to linear-equation software will be oriented more specifically to the case of related matrices B sub k. Author (GRA)

N83-25443# Wisconsin Univ., Madison. Mathematics Research Center.
ON THE DOMAIN SPACE FOR CONSTITUTIVE LAWS IN LINEAR VISCOELASTICITY Technical Summary Report
Michael Renardy Nov. 1982 14 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A124360; MRC-TSR-2445) Avail: NTIS HC A02/MF A01 CSCL 12/1

This document characterizes those constitutive laws in linear viscoelasticity which are compatible with certain phenomenological conditions. The constitutive law of a linearly viscoelastic fluid has a form indicating stress, linearized relative strain, and memory function (kernel a) factors. This kernel a may in general be a distribution. It is assumed that the following phenomenological conditions hold: The fluid resists deformation; positive strains yield positive stresses; and The strain resulting from a more recent instant of time has a greater influence than that from a more remote time. It is shown that the only kernels a consistent with these conditions consist of alpha a positive, monotone decreasing function defined on (O, infinity) and beta a sigma-distribution located at 0. The latter form of the kernel a corresponds to a Newtonian fluid. GRA

N83-25444# Wisconsin Univ., Madison. Mathematics Research Center.
A DIFFUSION EQUATION WITH A NONMONOTONE CONSTITUTIVE FUNCTION Technical Summary Report
Klaus Hollig and John A. Nohel Oct. 1982 19 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-72-27062)
(AD-A124345; MRC-TSR-2443) Avail: NTIS HC A02/MF A01 CSCL 12/1

In this report we first review known (previously unpublished) a priori estimates for (P), and we then give a simpler construction for the existence of infinitely many solution of (P) for a piecewise linear phi as suggested by G. Strang. we then investigate further the qualitative behavior of solutions of (P). Motivated by known results in one space dimension for the steady state, non-elliptic problem, we study the analogous convexified problem associated with (P). Analytical and numerical considerations suggest that the unique solution of the convexified problem (which has a monotone, nondecreasing constitutive function) can be interpreted as an average of solutions of (P), whenever the data f'(.) reach the critical range. GRA

N83-25445# Wisconsin Univ., Madison. Mathematics Research Center.
N-WIDTH AND ENTROPY OF H(p)-CLASSES IN L(g) (-1,1) Technical Summary Report
H. G. Burchard and Klaus Hollig Nov. 1982 31 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A124346; MRC-TSR-2444) Avail: NTIS HC A03/MF A01 CSCL 12/1

For analytic functions many of the standard approximation processes converge at an exponential rate. Using more sophisticated methds, it is still possible to obtain exponential convergence, even in the presence of singularities at the endpoints of an interval of approximation. In this paper we obtain precise upper and lower bounds for optimal convergence rates of approximation processes for the natural imbeddings of Hardy spaces into L sub Q (-1,1) in the sense of n-width, approximation numbers (linear n-width) and also entropy. This makes it possible to assess the optimality of bounds previously obtained for special approximation operators. GRA

N83-25446# Wisconsin Univ., Madison. Mathematics Research Center.
ON A VOLTERRA EQUATION WITH A LOCALLY FINITE MEASURE AND L INFINITY PERTURBATION Summary Report
Stig-Olof Londen Oct. 1982 26 p refs
(Contract DAAG29-80-C-0041)
(AD-A124347; MRC-TSR-2442) Avail: NTIS HC A03/MF A01 CSCL 12/1

The asymptotics of the solutions of a nonlinear scalar Volterra equation are investigated. M.G.

N83-25447# Wisconsin Univ., Madison. Mathematics Research Center.
HIDDEN LINE ELIMINATION IN PROJECTED GRID SURFACES Summary Report
David P. Anderson Dec. 1982 34 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-82-00632)
(AD-A124348; MRC-TSR-2447) Avail: NTIS HC A03/MF A01 CSCL 12/1

Hidden line and hidden surface problems are often simpler when restricted to special classes of objects. An example is the class of grid surfaces, i.e., graphs of bivariate functions represented by their values on a set of grid points. Projected grid surfaces have geometric properties which permit hidden line or hidden surface elimination to be done more easily then in the general case. These properties are discussed in this paper and an algorithm is given which exploits them. Author (GRA)

N83-25448# Wisconsin Univ., Madison. Mathematics Reseach Center.
A NONLINEAR VOLTERRA INTEGRODIFFERENTIAL EQUATION OCCURRING IN HEAT FLOW Summary Report
S.-O. Londen and J. A. Nohel (Helsinki Univ. of Technology) Oct. 1982 52 p refs
(Contract DAAG29-80-C-0041)
(AD-A124349; MRC-TSR-2440) Avail: NTIS HC A04/MF A01 CSCL 12/1

A nonlinear Volterra integrodifferential equation is studied. Under various assumptions motivated by heat flow in materials with memory, results on existence of solutions are obtained, followed by various results on boundedness and the asymptotic behavior of solutions with applications to such heat flow problems. GRA

N83-25449# Wisconsin Univ., Madison. Mathematics Research Center.
MEAN VALUES OF SUBSOLUTIONS OF ELLIPTIC AND PARABOLIC EQUATIONS Summary Report
William P. Ziemer Sep. 1982 34 p refs
(Contract DAAG29-80-C-0041)
(AD-A124355; MRC-TSR-2433) Avail: NTIS HC A03/MF A01 CSCL 12/1

Integral averages of weak subsolutions (and supersolutions) in Rn of quasilinear elliptic and parabolic equations are investigated. The important feature is that these integral averages are defined in terms of measures that reflect interesting geometric phenomena. Harnack type inequalities are established in terms of these integral averages. Author (GRA)

N83-25450# Stanford Univ., Calif. Dept. of Computer Sciences.
THE r-STIRLING NUMBERS
Andrei Z. Broder Dec. 1982 24 p refs
(Contract N00014-76-K-0330; Grant NSF MCS-77-23738)
(AD-A123472; SU-STAN-CS-82-949) Avail: NTIS HC A02/MF A01 CSCL 12/1

The r-Stirling numbers of the first and second kind count restricted permutations and respectively restricted partitions, the restriction being that the first r elements must be in distinct cycles and respectively distinct subsets. The combinatorial and algebraic properties of these numbers, which in most cases generalize similar properties of the regular Stirling numbers, are explored starting from the above definition. Author (GRA)

N83-25451# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
HOW TO DIVIDE A POLYGON FAIRLY
Bernard Chazelle Apr. 1982 25 p refs
(Contract F33615-81-K-1539; ARPA Order 3597)
(AD-A123335; CMU-CS-82-120) Avail: NTIS HC A02/MF A01 CSCL 12/1

Lipton and Tarjan's planar separator theorem (LT77, L177) is notable example of a systematic technique for introducing a computational tool, i.e., divide-and-conquer, into a whole class of relate problems, i.e., planar graph problems. Drawing its inspiration from this philosophy, this paper presents a theoretical result on polygon decomposition which can be applied to derive a number of efficient algorithms for geometric problems, in particular, problems of convex decompositions, triangulation, visibility, and internal distance. GRA

N83-25452# Wisconsin Univ., Madison. Mathematics Research Center.
CONVERGENCE RATES FOR MULTIVARIATE SMOOTHING SPLINE FUNCTIONS Technical Summary Report
Dennis D. Cox Oct. 1982 44 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A124368; MRC-TSR-2437) Avail: NTIS HC A03/MF A01 CSCL 12/1

Smoothing splines are used to approximate smooth functions when there are only available noisy values of the function at discrete values of the independent variables. It is shown herein that as the grid of values of the independent variables becomes denser in the region of interest, the smoothing spline estimate approaches the true function. Results on the rate of this convergence are given. Convergence of derivatives is investigated, also, but under the assumption that the region is bounded. The theory of linear elliptic partial differential equations is used extensively, along with eigenvalue approximation methods. Author (GRA)

N83-25453# Wisconsin Univ., Madison. Mathematics Research Center.
PERIODIC SOLUTIONS OF NON-DISSIPATIVELY PERTURBED WAVE EQUATIONS IN SEVERAL SPACE VARIABLES Technical Summary Report
Robert L. Sachs Sep. 1982 29 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-79-27062)
(AD-A124367; MRC-TSR-2429) Avail: NTIS HC A03/MF A01 CSCL 12/1

Rabinowitz proved the existence of 2 pi-periodic solutions of a one-dimensional non-linear wave equation for epsilon sufficiently small and f 2 pi-periodic in t, monotone in u, and sufficiently smooth. This answered a long-standing open question ad suggested that monotone methods could be used to overcome solvability problems in bifurcation situations with infinite dimensional kernels. In this paper the methods of Rabinowitz are extended to higher space dimensions, indicating that the special properties of the one-dimensional wave equation are not essential for that result. What remains crucial are hypotheses of rationality in the relations between the time period and the periods of the free vibrations for the wave equation, so that the inverse of the wave operator remains bounded on the complement of the null space. The other crucial factor is the assumption that the non-linearity depends monotonically on u, which enables us to solve for the piece of the solution

lying in the (possibly infinite dimensional) null space of the wave operator. GRA

N83-25454# Pittsburgh Univ., Learning Research and Development Center.
FORMS OF UNDERSTANDING IN MATHEMATICAL PROBLEM SOLVING
James G. Greeno Aug. 1982 59 p refs Submitted for publication
(Contract N00014-79-C-0215; NR Proj. 667-430)
(AD-A123384; UPITT/LRDC/ONR/APS-10) Avail: NTIS HC A04/MF A01 CSCL 05/10

Analyses of cognitive structures and processes involved in performing instructional tasks can provide objectives for instruction. This chapter focuses on performance that provides evidence of students' understanding. The analyses provide hypotheses about knowledge that constitutes two forms of understanding in the domain of high school geometry. One of these is structural understanding in Wertheimer's (1945/1959) sense, including knowledge that enables transfer of knowledge for solving problems to novel kinds of problems. The other is understanding of a formal principle that characterizes an important general property of solutions of problems in a domain. Author (GRA)

N83-25455# Carnegie-Mellon Univ., Pittsburgh, Pa. Dept. of Computer Science.
A STUDY IN PARALLEL COMPUTATION: THE TRAVELING SALESMAN PROBLEM
Joseph Mohan 18 Aug. 1982 28 p refs
(Contract D33615-81-K-1539; Grant NSF ECS-81-20270; ARPA Order 3597)
(AD-A123327; CMU-CS-82-136) Avail: NTIS HC A03/MF A01 CSCL 09/2

The Traveling Salesman Problem is solved on the Cm*, a multiprocessor system, using two implementations based on a branch and bound algorithm. One of these implementations is synchronous and has a granularity that increases with the degree of parallelism, while the other is asynchronous and has a constant granularity. With increasing degree of parallelism, the first implementation requires increasing amount of computation to solve the problem, leading to a speedup that saturates at a low value. The second implementation requires nearly the same amount computation at all degrees of parallelism and has reasonable speedup characteristic. The difference between the speedup of this implementation and linear speedup is attributed to processors idling because of resource contention. GRA

N83-25456# Arizona State Univ., Tempe. Dept. of Electrical and Computer Engineering.
SPECTRAL ESTIMATION: AN OVERDETERMINED RATIONAL MODEL EQUATION APPROACH Final Technical Report
James A. Cadzow Griffiss AFB, N.Y. RADC Oct. 1982 114 p refs
(Contract N00014-82-K-0257; Grant AF-AFOSR-0250-81; AF Proj. 4506)
(AD-A123676; RADC-TR-82-276) Avail: NTIS HC A06/MF A01 CSCL 12/1

In seeking rational models of time series, the concept of approximating second order statistical relationships (i.e., the Yule-Walker equations) is often explicitly or implicitly invoked. The parameters of the hypothesized rational model are typically selected so that these relationships best represent a set of autocorrelation lag estimates computed from time series observations. One of the objectives of the report will be that of establishing this fundamental approach to the generation of rational models. An examination of many popular contemporary spectral estimation methods reveals that the parameters of hypothesized rational model are estimated upon using a minimal set of Yule-Walker equation evaluations. This results in an undesired parameter hypersensitivity and a subsequent decrease in estimation performance. To counteract this parameter hypersensitivity, the concept of using more than the minimal number of Yule-Walker equation evaluations is herein developed. It is shown that by taking overdetermined parametric approach, a reduction in data induced model parameter hypersensitivity is obtained, and a corresponding improvement in modeling performance results. GRA

N83-25457# Ecodynamics Research Associates, Inc., Albuquerque, N. Mex.
ADAPTIVE GRID GENERATION USING ELLIPTIC GENERATING EQUATIONS WITH PRECISE COORDINATE CONTROLS Interim Report, 15 Oct. 1981 - 14 Oct. 1982
Patrick J. Roache 15 Oct. 1982 8 p
(Contract F49620-82-C-0064; AF Proj. 2304)
(AD-A123181; AFOSR-82-1092TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report summarizes results of the work on the contract to date in the areas of 2-D grid generation, 3-D grid generation, truncation error verification, 2-D adaptive grid for E-field calculations, and 3-D surface grid generation and interior grid control. The report also lists publications resulting from the contract work. Author (GRA)

N83-25458# State Univ. of New York, Binghamton. Dept. of Mathematical Sciences.
THE DISTRIBUTIONS OF MEASURES OF VISIBILITY ON LINE SEGMENTS IN THREE DIMENSIONAL SPACES UNDER POISSON SHADOWING PROCESSES
M. Yadin and S. Zacks 20 Dec. 1982 31 p refs
(Contract N00014-81-K-0407; NR Proj. 042-276)
(AD-A123183; TR-4) Avail: NTIS HC A03/MF A01 CSCL 12/1

The problem of determining the moments of visibility measures on star-shaped curves, under Poisson random shadowing process in the plane (see 4) is generalized here to the problem of determining the moments of visibility measures on line segments in a three-dimensional space, when the shadowing process is created by a Poisson random field of spheres of random size. The present paper provides the methodology for reducing the three-dimensional problem to a two-dimensional one, and employing the general theory of 4 to solve the present problem. Although the general approach is similar, the functions derived in the present paper are somewhat different to the sake of simplifying the computations. Author (GRA)

N83-25459# California Univ., Los Angeles. School of Engineering and Applied Science.
FILTERING OF SYSTEMS WITH NONLINEARITIES Final Report, 29 Nov. 1979 - 28 Nov. 1981
Hosam E. Emara-Shabaik Mar. 1982 50 p refs
(Contract DASG60-80-C-0007)
(AD-A124635) Avail: NTIS HC A03/MF A01 CSCL 12/1

Estimation problems, and filtering among them, are basically concerned with extracting the best information from inaccurate observation of signals. Perhaps the earliest roots of this type of problems go back to the least squares estimation at the time of Galileo Galilei in 1632 and Gauss in 1795. The relatively modern and more general development of least-squares estimation in stochastic processes is marked by the work of A.N. Kolmogorov and N. Wiener in the 1940's. Most recently, and due to vast research and development of the space age, the estimation theory experienced a new outlook. This was marked by the work of P. Swerling in 1958 and 1959 in connection with satellite tracking, and the work of R. Kalman using state space approach. Kalman's work had the impact of greatly popularizing and spreading the estimation theory in different fields of applications. Also, works by Stratonovich and Kushner are among the recent developments of the subject. In this document the nonlinear filtering problem is treated using a new approach. The approach consists of unifying a system model approximation technique with the filtering solution based on the approximate model. As a result, this paper describes three new practically implementable filters for stochastic dynamic systems which include nonlinearities in their structure. GRA

N83-25460# Naval Ocean Systems Center, San Diego, Calif. Fleet Engineering Dept.
EVALUATING J SUB N(z) VIA SERIES REPRESENTATION

Joel Carroll 28 Oct. 1982 69 p
(AD-A124690; NOSC/TR-850) Avail: NTIS HC A04/MF A01 CSCL 12/1

An algorithm and subroutine for evaluating J sub N(z) were developed to be used in determining the scattering of a plane elastic waves from a single, hollow cylindrical cavity. Two series were developed for computation purposes: one for the real part of J sub N(z) and one for the imginary part of J sub N(z). The subroutine utilizes double-precision arithmetic. The output includes the complex number EZ where the real and imaginary parts represent the magnitudes of upper bounds of errors in respective parts of J sub N(z). Computational studies strongly suggest that for true value of $z = or < 10$, the magnitudes of the error in the real and imaginary parts of J sub N(z) are less than 0.000001. From the same studies, computational times were always less than 0.04 second. GRA

N83-25461# Illinois Univ., Urbana. Applied Computation Theory Group.
BOOLEAN EXPRESSIONS OF RECTILINEAR POLYGONS WITH VLSI APPLICATIONS
Michele Pracchi Nov. 1982 54 p refs
(Contract N00014-79-C-0424; Grant NSF ECS-81-06939)
(AD-A124691; UILU-ENG-82-2244; ACT-36; R-978) Avail: NTIS HC A04/MF A01 CSCL 12/1

This work is devoted to the analysis of some aspects of the problem of mask verification in the design of integrated circuits. Boolean operations on masks - union, intersection, complement - are the fundamental steps in the development of these verification strategies. We first consider the problem of union and intersection of two masks in a rectilinear environment. The input masks are described by means of polygonal circuits. The output mask is the result of the boolean operation and it is always described by means of polygonal circuits. We present a plane sweep technique algorithm that solves this problem in time O(NlogN+k) and using memory O(N+k), where N is the total number of edges that define the polygonal circuits of the two input masks and k is the number of intersection points. The natural generalization of the problem is the construction of the plane regions that verify a boolean expression, whose variables are a set of masks. We first present an algorithm that has O(NlogN+k) running time and uses memory O(Nlogh+k'h+k'), where N is the total number of edges that define the polygonal circuits of all the masks, h the size of the boolean expression and k' is the number of intersection points that are vertices of the polygonal circuits of the output mask.
Author (GRA)

N83-25462# Wisconsin Univ., Madison. Mathematics Research Center.
RECURSIVE ESTIMATION PROCEDURES FOR MISSING-DATA PROBLEMS Technical Summary Report
D. M. Titterington and J.-M. Jiang Sep. 1982 26 p refs
(Contract DAAG29-80-C-0041)
(AD-A124358; MC-TSR-2427) Avail: NTIS HC A03/MF A01 CSCL 12/1

Titterington in a previous paper proposed recursive methods for dealing with incomplete data. This present paper concentrates on versions of these for multiparameter problems involving missing data. Theorems are outlined from which asymptotic properties of the recursive procedures can be established and versions of the recursions are written down for problems in which the missing data are missing at random. After illustration with exponential family models, the case of multivariate Normal data is considered in detail. Numerical comparisons of the various methods are obtained using bivariate Normal data. Whereas the previous paper discussed incomplete data in general, the present one restricts attention to the problem of missing values. Typically, each experimental unit should have records of the values of several characteristics associated with it. Statistical analysis is made difficult if one or more of those values are missing on some units. To combat the heavy analysis required for a proper analysis of the data, comparatively simple recursive procedures are outlined in which the data are incorporated sequentially into the estimation scheme. Some comments are made about theoretical properties and special emphasis is laid on the case of data from multivariate Normal distributions. GRA

N83-25463# Performance Measurement Associates, Inc., Vienna, Va.
ACCURACY AND COMPLETENESS OF PROBLEM SOLUTIONS WITH EXAMPLE-SOLUTIONS Final Report, 1 Sep. 1979 - 28 Feb. 1982
Edward M. Connelly Nov. 1982 14 p refs
(Contract N00014-79-C-0739; RR0420901)
(AD-A124087; PMA-82-363) Avail: NTIS HC A02/MF A01 CSCL 09/2

This research investigated the ability of computer users, both programmers and non-programmers, to specify problem solutions in the form of example-solutions. This ability was evaluated as a function of the complexity of the processor, i.e., the degree of generalization of the user inputs, the complexity of the problem, and the complexity of the feedback-aids. The experimental task employed in this study required the specification of a logic for the formation of a naval task-force. The performance both of programmers and non-programmers decreased with increasing levels of problem-complexity and with reduced processor support. For both the groups, errors-of-commission were relatively infrequent compared to errors-of-omission. It was found that the degree of processor-complexity was much more influential than problem-complexity in predicting performance scores. When little computer generalization of user-input was provided, performance was significantly lower than during all other experimental conditions. Results also showed that participant-strategy in the generation of problem solutions was a significant factor in performance, though years-of-experience and years-of-education were not found to be good predictors of performance. The feedback-aids were shown to be most effective when they included the logic implied by the example-solutions. These experiments demonstrate the effectiveness of the on-line use of computer software to create and modify software routines. Author (GRA)

N83-25464# Wisconsin Univ., Madison. Mathematics Research Center.
TWO APPROXIMATIONS OF SOLUTIONS OF HAMILTON-JACOBI EQUATIONS Technical Summary Report
Michael G. Crandall and P. I. Lions Sep. 1982 31 p refs
(Contract DAAG29-80-C-0041; Grant NSF MCS-80-02946)
(AD-A124359; MRC-TSR-2431) Avail: NTIS HC A03/MF A01 CSCL 12/1

Equations of Hamilton-Jacobi type arise in many areas of application, including the calculus of variations, control theory and differential games. The associated initial-value problems almost never have global-time classical solutions, and one must deal with suitable generalized solutions. The correct class of generalized solutions has only recently been established by the authors. This article establishes the convergence of a class of difference approximations to these solutions by obtaining explicit error estimates. Analogous results are proved by similar means for the method of vanishing viscosity. Author (GRA)

N83-25465# Princeton Univ., N. J. Dept. of Statistics.
ASYMPTOTIC SPECTRAL ANALYSIS OF CROSS-PRODUCT MATRICES
G. S. Watson Nov. 1982 26 p refs
(Contract N00014-81-K-0146)
(AD-A123438; Rept-7) Avail: NTIS HC A03/MF A01 CSCL 12/1

T.W. Anderson (1963) derived the asymptotic distribution of the eigenvalues and vectors of the covariance matrix of a sample from a Gaussian distribution. Davis (1977) took his basic method and used it to get some results for the non-Gaussian case. The non-Gaussian case is of interest either because one wants to study the sensitivity of methods to deviations from Gaussianity - see e.g., Muirhead (1982) - or because one has to deal with other distributions. Author (GRA)

N83-25466# Pittsburgh Univ., Dept. of Mathematics and Statistics.
CONTINUOUS MULTISTATE STRUCTURE FUNCTIONS
Henry W. Block and Thomas H. Savits Jul. 1982 22 p refs
(Contract N00014-76-C-0839)
(AD-A123444; TR-82-27) Avail: NTIS HC A02/MF A01 CSCL 12/1

Multistate structure functions on state spaces which are not necessarily finite are discussed. Integral representations are derived which extend the decomposition of Block and Savits (1982). Bounds for the structure function are obtained and the representation is applied to the Barlow-Wu structure function and to nondecreasing homogeneous functions. Author (GRA)

N83-25467# Digital Programming Services, Inc., Waltham, Mass.
DERIVATION AND IMPLEMENTATION OF EXPONENTIAL FUNCTIONS TO MODEL AXIAL SCATTERING SPECTROMETER DATA DISTRIBUTIONS Scientific Report, 1 Aug. 1981 - 30 Sep. 1982
Lawrence E. Belsky, James P. Lally, and Peter L. Miller Hanscom AFB, Ohio AFGL 30 Sep. 1982 27 p refs
(Contract F19628-81-C-0141; AF Proj. 2310)
(AD-A123388; AFGL-TR-82-0309; SR-1) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report details the mathematical derivation of the Weibull and gamma distribution functions for the purpose of approximating cloud droplet spectra data via a mathematical model, and analyzes the ability of each function to model the data distributions. Author (GRA)

N83-25468# Virginia Polytechnic Inst. and State Univ., Blacksburg.
ESTIMATING DISTRIBUTED LAG COEFFICIENTS WHEN THERE ARE ERRORS IN THE OBSERVED TIME SERIES
Melvin J. Hinich Dec. 1982 23 p refs
(Contract N00014-75-C-0494)
(AD-A123460; TR-26) Avail: NTIS HC A02/MF A01 CSCL 12/1

Estimating the distributed lag coefficients (h(mTAU)) from a sample of the two processes when (x(NTAU)) and (y(nTAU)) are measured with error is a statistical problem that is frequently encountered in physical science, engineering, and social science applications. In the engineering and science literature the distributed lags are called the impulse response weights of a causal linear filter. A least squares fit of the model gives biased estimates of the coefficients for this time series version of the errors-in-variables problem. This paper presents approximately unbiased estimators of a scalar multiple of the coefficients. Author (GRA)

N83-25469# Ohio State Univ., Columbus. Dept. of Geodetic Science and Surveying.
GRAVITY PARAMETER ESTIMATION FROM LARGE DATA SETS USING STABILIZED INTEGRAL FORMULAS AND A NUMERICAL INTEGRATION BASED ON DISCRETE POINT DATA
Reiner Rummel Sep. 1982 37 p refs
(Contracts F19628-82-K-0022; F19628-79-C-0027; AF Proj. 2309)
(AD-A123397; DGS-339; SCIENTIFIC-2; AFGL-TR-82-0295) Avail: NTIS HC A03/MF A01 CSCL 12/1

A gravity parameter estimation technique is proposed that allows the processing of arbitrarily large and (at least locally) densely spaced, homogeneous sets of observations. The method is characterized by two independent features: First, for a problem at hand the least-squares collocation estimator is replaced by its corresponding global limit where it becomes a stable integral formula. This way the large (infinite dimensional) system of linear equations can be solved analytically. Moreover, since the integral formulas represents an optimal estimator a reliable error measure can be linked to it. Second, the integral formula is approximated by numerical integration, but directly based on the discrete point observations instead of the commonly used mean block values. The required area weights attached to each observation are derived from a numerical triangulation spread over all data points. In a first and preliminary test some 1 deg x 1 deg mean gravity anomalies were computed from GEOS-3 altimetry. Author (GRA)

N83-25470# Oak Ridge National Lab., Tenn. Dept. of Computer Sciences.
A METHOD FOR INTERPOLATING IN BONDARENKO FACTOR TABLES AND OTHER FUNCTIONS
N. M. Greene 1982 17 p refs
(Contract W-7405-eng-26)
(DE82-015685; CONF-820566-1) Avail: NTIS HC A02/MF A01

A simple, monotonic interpolation procedure is presented which has several advantages. In addition to its generality, its simplicity makes it particularly easy to use in typical computer applications. DOE

N83-25471# California Univ., Livermore. Lawrence Livermore Lab.
MATHEMATICAL DEFINITION OF PROTOCOL TRANSLATION
M. M. Ong 26 Mar. 1982 10 p refs Presented at the 7th Conf. on Local Computer Networks, Minneapolis, 12 Oct. 1982
(Contract W-7405-eng-48)
(DE82-015188; UCRL-87474; CONF-821006-2) Avail: NTIS HC A02/MF A01

Protocol translation, which is a function employed to interconnect different computer networks, is discussed. An example of an application is a gateway. DOE

N83-25472# Oak Ridge National Lab., Tenn. Computer Sciences Dept.
USING THE METHOD-OF-LINES TECHNIQUE TO SOLVE INITIAL-BOUNDARY-VALUE PARTIAL DIFFERENTIAL EQUATIONS
P. W. Gaffney 1982 4 p refs Presented at the 10th Intern. Math. and Computer Simulation Congr. on Systems Simulation and Sci. Computation, Montreal, 9 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020909; CONF-820810-11) Avail: NTIS HC A02/MF A01

Some of the disadvantages of the numerical method of lines technique for solving initial boundary value partial differential equations are outlined. FORTRAN codes which implement this technique are reviewed in the context of their application to practical problems. Particular emphasis is given to numerical software that is suitable for solving the initial value ordinary differential equations which result from applying this method to realistic problems. DOE

N83-25473# Union Carbide Corp., Oak Ridge, Tenn. Mathematics and Statistics Research Dept.
MOMENT SERIES FOR MOMENT ESTIMATORS OF THE PARAMETERS OF A WEIBULL DENSITY
K. O. Bowman and L. R. Shenton (Georgia Univ., Athens) 1982 49 p refs Presented at the 14th Ann. Symp. on the Interface Rensselaer Polytechnic Inst. on Computer Sci. and Statistics, Troy, N.Y., 6 Jul. 1982
(Contract W-7405-eng-26)
(DE82-018265; CONF-820737-1) Avail: NTIS HC A03/MF A01

Taylor series for the first four moments of the coefficients of variation in sampling from a 2-parameter Weibull density are given: they are taken as far as the coeffient of n(-24). From these a four moment approximating distribution is set up using summatory techniques on the series. The shape parameter is treated in a similar way, but here the moment equations are no longer explicit estimators, and terms only as far as those in n(-12) are given. The validity of assessed moments and percentiles of the approximating distributions is studied. Consideration is also given to properties of the moment estimator for 1/c. DOE

N83-25474# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.
THE EFFECT OF CHANGING STEP SIZE ON THE ACCURACY OF MULTISTEP FORMULAS
Lawrence F. Shampine Jul. 1982 17 p refs
(Contract DE-AC04-76DP-00789)
(DE82-020884; SAND-82-1584) Avail: NTIS HC A02/MF A01

The numerical solution of the initial value problem for a system of ordinary differential equations, Y' = dy/dx = F(x,y), a < or = b, y(a) given, by discrete variable formulas is addressed. Such formulas approximate the solution y(x) at points x sub m by y sub m = y(x sub m). Variable step size codes are reviewed including the Adams-Bashforth formulas, Adams-Moulton formulas, and backward differential formulas. The effect of altering step size on accuracy is examined. M.G.

N83-25475# Brown Univ., Providence, R. I. Dept. of Physics.
GREEN'S FUNCTIONS AT ZERO VISCOSITY
H. M. Fried and J. Tessendorf 1982 20 p refs
(Contract DE-AC02-76ER-03130)
(DE83-004528; BROWN/HET-480) Avail: NTIS HC A02/MF A01

Fradkin type propagator representations are written for solutions to Navier-Stokes and related equations, for arbitrary dimension D and arbitrary source geometry. In the limit of very small viscosity, velocity/vorticity solutions are given in terms of Cauchy position coordinates q of a particle advected by the velocity flow v, using a set of coupled equations for q and v. For localized point vortices in two dimensions, the vectors q become the time dependent position coordinates of interacting vortices, and our equations reduce to those of the familiar, coupled vortex problem. The formalism is, however, able to discuss three dimensional vortex motion, discrete or continuous, including the effects of vortex stretching. The mathematical structure of vortex stretching in a D dimensional fluid without boundaries is conveniently described in terms of an SU(D) representation of these equations. Several simple examples are given in two dimensions. In three dimensions, vortex stretching effects are approximated using a previous strong coupling technique of particle physics, enabling one to build a crude model of the intermittent growth of enstrophy, which may signal the onset of turbulence. For isotropic turbulence, the possibility of a singularity in the inviscid enstrophy at a finite time is related to the behavior of a single function characterizing the intermittency. DOE

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-25476# Wisconsin Univ., Madison. Mathematics Research Center.
DIFFICULTIES WITH REGRESSION ANALYSIS OF AGE-ADJUSTED RATES Technical Summary Report
Paul R. Rosenbaum and Donald B. Rubin Sep. 1982 22 p refs Sponsored in part by National Cancer Inst.
(Contract DAAG29-80-C-0041)
(AD-A124381; MRC-TSR-2428) Avail: NTIS HC A02/MF A01 CSCL 12/1

A common type of observational study compares population rates in several regions having differing policies in an effort to assess the effects of those policies. In many studies, particularly in public health and epidemiology, age-adjusted rates are regressed on predictor variables to obtain a covariance adjusted estimate of effect; we show that this estimate is generally biased for the appropriate regression coefficient. The analysis of crude rates with age as a covariate can, under familiar models, leads to unbiased estimates, and therefore can be preferrable. Several other regression methods are also considered. Author (GRA)

N83-25477# Iowa Univ., Iowa City. Dept. of Statistics and Actuarial Science.
A FORTRAN PROGRAM FOR THE LEVEL PROBABILITIES OF ORDER RESTRICTED INFERENCE
Carolyn Pillers, Tim Robertson, and F. T. Wright Jul. 1982 12 p refs
(Contract N00014-80-C-0321)
(AD-A123511; TR-87) Avail: NTIS HC A02/MF A01 CSCL 12/1

The level probabilities of order restricted inference are fundamental to that theory; their values are the probabilities that the order restricted, maximum likelihood estimates of normal means assume specified numbers of distinct values, called levels. Those probabilities are computed under the assumptions that the population means are equal and that the sampling from the various populations is done independently. The level probabilities depend upon a vector of weights (usually the various sample sizes) and the use of much of the theory of order restricted inference has been limited by the fact that those level probabilities can be virtually impossible to compute if the weights are not all equal. GRA

N83-25478# North Carolina Univ., Chapel Hill. Office of Curriculum in Operations Research and Systems Analysis.
GENERATING PARALLEL CORRELATED TRANSITION FREQUENCIES FOR A MARKOV CHAIN
George S. Fishman Dec. 1982 27 p refs
(Contract N00014-76-C-0302)
(AD-A124250; UNC/ORSA/TR-82/8) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes an algorithm and a FORTRAN program called MCHAIN for simulating k parallel Monte Carlo replications of a Markov chain using rotation sampling. This method of sampling produces k sample transition frequency vectors with a desirable structure of statistical dependence among them. In particular, these sample vectors can be used to estimate the probability that, say, n sub 1, ..., n sub r transitions of types 1,...,r occur during a first passage from state a to state b with a variance of the estimate of 0(1/k squared) and a computation time 0(k) as k yields infinity. This compares favorably with the case of independent replications wherein the estimate would have a variance 0(1/k) and computation time 0(k) as k yields infinity. An example including a sample driver program are presented to illustrate how MCHAIN works in practice. Author (GRA)

N83-25479# North Carolina Univ., Chapel Hill. Office of Curriculum in Operations Research and Systems Analysis.
VARIANCE REDUCTION IN THE SIMULATION OF STOCHASTIC ACTIVITY NETWORKS
George S. Fishman Jan. 1983 31 p refs
(Contract N00014-76-C-0302)
(AD-A124251; UNC/ORSA/TR-82/7) Avail: NTIS HC A03/MF A01 CSCL 12/1

This paper describes a Monte Carlo method based on the theory of quasirandom points for estimating the distribution functions and means of network completion time and shortest path time in a stochastic activity network. In particular, the method leads to estimators whose variances converge faster than 1/K, where K denotes the number of replications collected in the experiment. The paper demonstrates how accuracy diminishes for a given K with increasing dimensionality of the network and shows how a procedure that uses a cutset of the network together with convolution can reduce dimensionality and increase accuracy. Two examples illustrate the benefits of using quasirandom points together with a cutset and then convolution. Author (GRA)

N83-25480# North Carolina Univ., Chapel Hill. Office of Curriculum in Operations Research and Systems Analysis.
SUPEREFFICIENT SIMULATION OF MARKOV CHAINS AND SEMI-MARKOV PROCESSES
George S. Fishman Oct. 1982 21 p refs
(Contract N00014-76-C-0302)
(AD-A124252; UNC/ORSA/TR-82/5) Avail: NTIS HC A02/MF A01 CSCL 12/1

This paper describes a method of simulating a Markov chain for the purpose of estimating functions of the chain and functions of associated semi-Markov processes. In particular, special attention is devoted to the estimation of the probability density function of first passage time from, say, state a to state b. Rotation sampling is used to achieve variances of estimators of order 0(1/k squared), where k is the number of replications, which compares with 0(1/k) when independently sampled replications are used.

Since both independent and rotation sampling have computation time complexity 0(k), the relative advantage of rotation sampling is clear as k implies infinity. The paper presents two examples to illustrate the method. Author (GRA)

N83-25481# Ballistic Research Labs., Aberdeen Proving Ground, Md.
ROBUST REGRESSION: A DIAGNOSTIC TOOL
Jock Grynovicki and Jerry Thomas Jan. 1983 33 p refs
(DA Proj. 1L1-62618-AH-80)
(AD-A123651; ARBRL-TR-02459) Avail: NTIS HC A03/MF A01 CSCL 12/1

This report discusses the usefulness of robust regression when distorted observations have undue influence on the normal least squares regression fit. Instead of throwing out these distorted observations, Iteratively Reweighted Least Squares (IRLS) techniques are used to reduce the influence these outliers have on the fitted line. These robust techniques were utilized through a Robust Statistical Estimation Computer Package (ROSEPACK) that was developed at Massachusetts Institute of Technology. A detailed description of how to run this statistical package of the BRL CYBER system is also presented. GRA

N83-25482# Wisconsin Univ., Madison. Mathematics Research Center.
PERCENTAGE POINTS AND POWER CALCULATIONS FOR OUTLIER TESTS IN A REGRESSION SITUATION
Camil Fuchs and Norman R. Draper Oct. 1982 34 p refs
(Contracts DAAG29-80-C-0041; DAAG29-80-C-0113)
(AD-A124369; MRC-TSR-2436) Avail: NTIS HC A03/MF A01 CSCL 12/1

The usefulness of an extra sum of squares statistic Q sub K for detecting K outliers has been discussed in previous papers in the context of two-way tables. That work is extended here to straight line regression situations arising from and motivated by a specific set of research data. Percentage points for the appropriate test statistics are obtained by simulation, approximations for these percentage points are suggested, and power calculations are made for various designs and outlier situations. Correct determination of K and position(s) of the outlier(s) appear to be important in influencing power. GRA

N83-25483# Los Alamos Scientific Lab., N. Mex.
ASPECTS OF MODEL SELECTION IN MULTIVARIATE ANALYSES
Richard Picard 1982 15 p refs Presented at the 1982 DOE Statist. Symp., Idaho Falls, Idaho, 1 Oct. 1982
(Contract W-7405-eng-36).
(DE82-019576; LA-UR-82-1893; CONF-821021-1) Avail: NTIS HC A02/MF A01

Analysis of data sets that involve large numbers of variables usually entails some type of model fitting and data reduction. In regression problems, a fitted model that is obtained by a selection process can be difficult to evaluate because of optimism induced by the choice mechanism. Problems in areas such as discriminant analysis, calibration, and the like often lead to similar difficulties. Some of the general ideas behind assessment of regression-type predictors and how they can be easily incorporated into a standard data analysis are discussed. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-25484# California Univ., Los Angeles. School of Engineering and Applied Science.
SINGULAR DIFFERENTIAL GAME NUMERICAL TECHNIQUE AND CLOSED LOOP GUIDANCE AND CONTROL STRATEGIES Final Report, 29 Nov. 1979 - 28 Nov. 1981
Kamran Forouhar Mar. 1982 145 p refs
(Contract DASG60-80-C-0007)
(AD-A124625) Avail: NTIS HC A07/MF A01 CSCL 12/1

In this report a class of linear quadratic pursuit-evasion games with bounds on the pursuer's control has been defined. In this problem the pursuer's control appears linearly in the Hamiltonian and singular arcs may occur in the solution. A sufficient condition for the existence of saddle point for this class of problems is derived. An indirect numerical technique has been proposed to generate a rapid and accurate solution to a class of problems with linear state equations in which singular arcs occur. Then, by linearization this technique is extended to solve a class of problems with non-linear state equations. By modifying this technique a second approach has been obtained that can solve a broader class of singular problems with linear state equations. The effect of the deviation of one player from the saddle point strategy on the performance index and the opponent's strategy has been studied for a two person zero-sum differential game with perfect information. An inverse system technique is used to determine the opponent's strategy by periodically measuring the state or the output of the system. Then, the proposed technique for singular problems is applied periodically to generate an approximate closed loop solution (which takes into consideration the deviation of the opponent from the saddle point trajectory) to achieve better performance than simply following the optimal open loop solution. A numerical example is presented to illustrate the efficiency of the proposed algorithm, and, comparisons have been made between the results of the open loop and closed loop solutions. GRA

N83-25485# California Univ., Los Angeles. School of Engineering and Applied Science.
STOCHASTIC DIFFERENTIAL GAMES WITH COMPLEXITY CONSTRAINED STRATEGIES Final Report, 29 Nov. 1979 - 28 Nov. 1981
Donald Macdonald Stuart, Jr. Mar. 1982 125 p refs
(Contract DASG60-80-C-0007)
(AD-A124627) Avail: NTIS HC A06/MF A01 CSCL 12/1

An examination is made of some problems encountered in the optimal control of a linear dynamic system by two independent controllers with noisy state observations, the controllers having either conflicting or concurring objectives. The question of what form the optimal controls should take is also discussed. By restricting consideration to linear forms, it is shown that the computational complexity of a general optimal linear strategy is considerable. Attention is further restricted to a particular linear form for the optimal controls: a matrix transformation of a vector which is the solution of a linear differential equation forced by the observations. Properties of certain forms of this type of control are analyzed, and it is shown that the parameters of these forms may be expressed in terms of solutions to a set of nonlinear differential equations with split boundary conditions. It is also demonstrated that these forms reduce, in a one-input case, to those specified by the separation principle of one-sided optimal control. Author (GRA)

N83-25486# Naval Postgraduate School, Monterey, Calif. Dept. of Operations Research.
A GAME THEORY APPROACH TO SEARCH M.S. Thesis
Clark Wallis Pritchett Oct. 1982 70 p refs
(AD-A124631) Avail: NTIS HC A04/MF A01 CSCL 12/1

A model of search of an area is developed using the probability of detection as the measure of effectiveness. The area is partitioned into two pieces. Two search units, with different capabilities, attempt to detect one evader. If the search efforts of the two units do not overlap, the probability of detection is the same no matter how the area is partitioned. An approach based upon Game theory is also developed. The variance of the probability of detection is computed and used to select strategies for searching. Author (GRA)

N83-25487# California Univ., Los Angeles. School of Engineering and Applied Science.
STOCHASTIC DIFFERENTIAL GAME TECHNIQUES Final Report, 29 Nov. 1979 - 20 Nov. 1981

Barend Mons Mar. 1982 163 p refs
(Contract DASG60-80-C-0007)
(AD-A124634) Avail: NTIS HC A08/MF A01 CSCL 12/1

This development of readily computable strategies for differential games with noise corrupted measurements was hampered by the so called closure problem of stochastic differential games. The solutions required either an infinite dimensional dynamic system or the determination at each time t of the error in the opponent's state estimate. In this dissertation, solutions to different games with noise corrupted measurements were obtained that are readily computable. As a consequence of the stochastic aspects of such games, the discussion was restricted to linear-quadratic differential games which are analyzed using function space techniques. The solution to a linear-quadratic game with perfect information is obtained without the a prior assumption of a saddle-point solution and it is shown that the individual minimax and maximin solutions to such a game result in a set of strategies that satisfy the saddle-point condition, but with necessary and sufficient conditions that are more stringent than previously obtained. The concept of delayed commitment games is then extended to differential games where both players have noise corrupted state measurements and solutions are obtained that are readily computable, thus playing to rest the closure problem of stochastic differential games. GRA

N83-25488# Illinois Univ., Urbana. Decision and Control Lab.
THE RESTRICTED STACKELBERG PROBLEM M.S. Thesis
John Ting-Yung Wen Jun. 1981 67 p refs
(Contract N00014-79-C-0424; Grants AF-AFOSR-3633-78; NSF ECS-79-19396)
(AD-A124638; UILU-ENG-81-2242; DC-46; R-911) Avail: NTIS HC A04/MF A01 CSCL 12/1

The Stackelberg equilibrium strategy concept has wide applications in modeling of socio-economic and large scale systems. Its analytic difficulty, however, poses a main drawback. The Restricted Stackelberg Problem (RSP) considers a subset of the Stackelberg strategy where the leader achieves his team cost. It is more analytically tractable and offers a viable alternative. This report investigates discrete, LQ RSP using dynamic-to-static conversion. The approach reduces the dynamic progression of variables into an augmented static domain. The static results can then be applied. New sufficient conditions are obtained in simple forms as linear matrix equations for the centralized, decentralized and stochastic centralized information structures. These conditions also encompass the similar work done previously. Large threat strategy is examined as a possible near-optimal solution. It is found that as the threat tends to infinity, a nonzero offset from the team cost exists for the linear strategy representation, and team cost can be achieved for the discontinuous strategy. GRA

N83-25489# Illinois Univ., Urbana. Coordinated Science Lab.
MINIMAX ROBUSTNESS IN COMMUNICATION AND CONTROL Annual Progress Report, 1 Oct. 1981 - 30 Sep. 1982
H. Vincent Poor 16 Feb. 1983 7 p refs
(Contract N00014-81-K-0014)
(AD-A124639; T-123) Avail: NTIS HC A02/MF A01 CSCL 12/1

This report describes progress on the referenced contract for the fiscal year 1982. This progress includes results in a number of problems concerned with minimax robustness in communication and control. Author (GRA)

N83-25490# Southwest Research Inst., San Antonio, Tex.
A VALUE-ASSESSMENT AID TO COMPLEX DECISION MAKING Final Report
G. Humphress and E. Lewis Jul. 1982 113 p refs Sponsored by EPRI
(EPRI Proj. 1391-4)
(DE82-905815; EPRI-NP-2507) Avail: NTIS HC A06/MF A01

Value assessment (VA) is a new decision aid that can improve the performance of decision makers confronted with multiple attributes and conflicting objectives. Managers who are not supported by formal decision aids turn to various effort reducing biases that can lead to serious errors in the decisionmaking process. Value assessment, on the other hand, is an optimizing approach to problem solving behavior. VA helps decision makers overcome the tendency to turn to effort reducing biases by reducing the complexity of making tradeoffs and weighing all available information. Many of the issues which confront modern electric utility managements are complex, multiple attribute problems which must be viewed from engineering, financial and socio-political perspectives simultaneously. Added to this are the complications contributed by factors like uncertainty, risk, incomplete information and conflicting objectives among the public it serves. This is the complex decisionmaking arena which VA is intended to support. DOE

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-25491# Oak Ridge National Lab., Tenn. Mathematics and Statistics Research Dept.
LU DECOMPOSITIONS OF GENERALIZED DIAGONALLY DOMINANT MATRICES
R. E. Funderlic, M. Neumann, and R. J. Plemmons Feb. 1982 36 p refs
(Contracts W-7405-eng-26; DAAG29-81-K-0132; Grant NSF MCS-81-02114)
(ORNL/CSD-98) Avail: NTIS HC A03/MF A01

Using the simple vehicle of M-matrices, the existence and stability of LU decompositions of matrices A which can be scaled to diagonally dominant (possibly singular) matrices are investigated. Bounds on the growth factor for Gaussian elimination on A are derived. Motivation for this study is provided in part by applications to solving homogeneous systems of linear equations $Ax = 0$, arising in Markov queuing networks, input-output models in economics and compartmental systems, where A or -A is an irreducible, singular M-matrix. M.G.

N83-25492# Illinois Univ., Chicago. Dept. of Mathematics.
BIB DESIGNS WITH BLOCKS OF MAXIMAL MULTIPLICITY
G. M. Constantine (Indiana Univ.) and A. S. Hedaya (California Univ.) Mar. 1982 13 p refs
(Grants AF-AFOSR-0170-80; NSF MCS-81-01727; AF Proj. 2304)
(AD-A123220; AFOSR-82-1079TR) Avail: NTIS HC A02/MF A01 CSCL 12/1

The set of distinct blocks of a block design is known as its support. We construct a BIB design with parameters $V > or = 7$, $k = 3$, lambda $= v - 2$ which contains a block of maximal multiplicity and has support $(V/3) - 4(v-3)$. Any BIB design which contains such a block and has parameters as above must be supported on at most $(V/3) - 4(v-3)$ blocks. Author (GRA)

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-25493# Massachusetts Inst. of Tech., Cambridge. Research Lab. of Electronics.
STUDIES IN REMOTE SENSING, ASTRONOMY AND GENERAL PHYSICS Progress Report, 1 Jan. - 31 Dec. 1981
J. Allen and P. A. Wolff Jan. 1982 237 p refs
(RLE-PR-124) Avail: NTIS HC A11/MF A01

Several areas of electronics were addressed including: molecule microscopy, semiconductor surface studies, atomic resonance, scattering, reaction dynamics, phase transitions, quantum electronics, and digital signal processing. B.G.

N83-25494# Washington Univ., Seattle. Dept. of Physics.
ELECTROWEAK INTERACTIONS
E. M. Henley Apr. 1982 19 p refs Presented at the Conf. on New Horizons on Electromagnetics, Charlottesville, Va. 21 Apr. 1982

(Contract DE-AC06-81ER-40048)
(DE82-020146; DOE/ER-40048/10N2; CONF-820475-2) Avail: NTIS HC A02/MF A01

An attempt to show that electron scattering is a versatile tool to explore the weak interactions and test electroweak theories is presented. Once a theory is well established these experiments serve to measure structure functions. For low energy electrons the PV asymmetry is sensitive to the weak force between nucleons; for intermediate energies it is reasonable to use electron scattering experiments to carry out detailed tests of the W-S or other electroweak theories. At very high energies, electron scattering occurs from almost free quarks and perturbative QCD can be applied. Finally, at intermediate high energies, it is likely that PV electron scattering experiments will serve as a powerful tool to investigate quark distribution functions and perhaps teach us more about quark confinement and its connection to the meson theory of nuclear forces. DOE

N83-25495# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
HIGH-FIELD SUPERCONDUCTING ACCELERATOR MAGNETS
C. Taylor, R. Meuser, S. Caspi, W. Gilbert, W. Hassenzahl, C. Peters, and R. Wolgast May 1982 7 p refs Presented at the 9th Intern. Cryogenic Eng. Conf., Kobe, Japan, 10 May 1982
(Contract DE-AC03-76SF-00098)
(DE82-020517; LBL-14400; CONF-820546-10) Avail: NTIS HC A02/MF A01

The next generation of accelerators for high-energy physics will require high-field, small-bore dipole magnets in the region of 10 T and 40-mm diam. For such magnets, there is a great incentive to attain high overall current density through increasing the current density within the superconductor and minimizing the copper stabilizer. Both Nb-Ti operating at 1.8 K and Nb3sn at 4.2 are candidate superconductors. Two programs in the US and one in Japan are directed toward the development of such magnets. The program at Lawrence Berkeley Laboratory is described. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N83-25496*# Michigan Univ., Ann Arbor. Survey Research Center.
ESTIMATING REGRESSION COEFFICIENTS FROM CLUSTERED SAMPLES: SAMPLING ERRORS AND OPTIMUM SAMPLE ALLOCATION Final Report
Graham Kalton Hampton, Va. NASA. Langley Research Center May 1983 28 p refs
(Contract NAS1-16107)
(NASA-CR-166117; NAS 1.26:166117) Avail: NTIS HC A03/MF A01 CSCL 20A

A number of surveys were conducted to study the relationship between the level of aircraft or traffic noise exposure experienced by people living in a particular area and their annoyance with it. These surveys generally employ a clustered sample design which affects the precision of the survey estimates. Regression analysis of annoyance on noise measures and other variables is often an important component of the survey analysis. Formulae are presented for estimating the standard errors of regression coefficients and ratio of regression coefficients that are applicable with a two- or three-stage clustered sample design. Using a simple cost function, they also determine the optimum allocation of the sample across the stages of the sample design for the estimation of a regression coefficient. M.G.

N83-25497*# Kansas Univ. Center for Research, Inc., Lawrence. Flight Research Lab.
STUDY OF NOISE REDUCTION CHARACTERISTICS OF DOUBLE-WALL PANELS Progress Report, 1 Nov. 1982 - 30 Apr. 1983
Ramasamy Navaneethan, Brian Quayle, Scott Stevenson, and Mike Graham May 1983 181 p refs
(Contract NCC1-6)
(NASA-CR-170308; NAS 1.26:170308; KU-FRL-417-21) Avail: NTIS HC A09/MF A01 CSCL 20A

The noise reduction characteristics of general aviation type, flat, double-wall structures were investigated. The experimental study was carried out on 20-by-20 inch panels with an exposed area of 18 by 18 inches. A frequency range from 20 to 5000 Hz was covered. The experimental results, in general, follow the expected trends. At low frequencies the double-wall structures are no better than the single-wall structures. However, for depths normally used in the general aviation industry, the double-wall panels are very attractive. The graphite-spoxy skin panels have higher noise reduction at very low frequencies (> 100 Hz) than the Kevlar skin panels. But the aluminum panels have higher noise reduction in the high frequency region, due to their greater mass. Use of fiberglass insulation is not effective in the low frequency region, and at times it is even negative. But the insulation is effective in the high-frequency region. The theoretical model for predicting the transmission loss of these multilayered panels is also discussed. M.G.

N83-25498*# Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
LIMITS ON THE PREDICTION OF HELICOPTER ROTOR NOISE USING THICKNESS AND LOADING SOURCES: VALIDATION OF HELICOPTER NOISE PREDICTION TECHNIQUES Contractor Report, 1981 - 1982
George P. Succi Apr. 1983 93 p refs
(Contract NAS1-16886)
(NASA-CR-166097; NAS 1.26:166097; BBN-5114) Avail: NTIS HC A05/MF A01 CSCL 20A

The techniques of helicopter rotor noise prediction attempt to describe precisely the details of the noise field and remove the empiricisms and restrictions inherent in previous methods. These techniques require detailed inputs of the rotor geometry, operating conditions, and blade surface pressure distribution. The Farassat noise prediction techniques was studied, and high speed helicopter noise prediction using more detailed representations of the thickness and loading noise sources was investigated. These predictions were based on the measured blade surface pressures on an AH-1G rotor and compared to the measured sound field. Although refinements in the representation of the thickness and loading noise sources improve the calculation, there are still discrepancies between the measured and predicted sound field. Analysis of the blade surface pressure data indicates shocks on the blades, which are probably responsible for these discrepancies. S.L.

N83-25499*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ACOUSTICAL MODAL ANALYSIS OF THE PRESSURE FIELD IN THE TAILPIPE OF A TURBOFAN ENGINE
Eugene A. Krejsa and Allen M. Karchmer 13 May 1983 32 p refs Presented at 105th Meeting of the Acoust. Soc. of Am., Cincinnati, 9-13 May 1983
(NASA-TM-83387; E-1665; NAS 1.15:83387) Avail: NTIS HC A03/MF A01 CSCL 20A

The results of a modal analysis of the pressure field in the tailpipe of a turbofan engine are presented. Modal amplitudes, at the tailpipe inlet and exit, are presented, as a function of frequency, for several operating conditions. The modal amplitudes were obtained using an optimization routine to obtain a best fit between measured cross spectra and an analytical expression for the cross spectra between pressures at circumferentially spaced locations. The measured pressure field was decomposed into a set of five modal amplitudes corresponding to the (0,0), (1,0), (2,0), (3,0), and (4,0) modes. The analysis was limited to frequencies below 1500 Hz where higher order modes are cutoff. The results of the analysis showed that at low frequencies, up to the cuton frequency of the (1,0) mode, the (0,0) mode (plane wave) dominated the pressure field. The frequency range from the cuton of the (1,0)

mode to the cuton of the (2,0) mode was dominated by the (1,0) mode. The (2,0) mode dominated from its cuton frequency to the upper limit of the analysis, i.e., 1500 Hz. The contribution of modes other than the dominant mode was usually small. S.L.

N83-25500# Federal Aviation Administration, Washington, D.C. Office of Environment and Energy.
HELICOPTER NOISE EXPOSURE CURVES FOR USE IN ENVIRONMENTAL IMPACT ASSESSMENT *Final Report*
J. Steven Newman, Edward J. Rickley, and Tyrone L. Bland Nov. 1982 160 p
(AD-A123467; DOT/FAA/EE-82/16) Avail: NTIS HC A08/MF A01 CSCL 20/1

This report establishes the current (1982) FAA helicopter noise data base for use in environmental impact assessment. The report sets out assumptions, methodologies, and techniques used in arriving at noise-exposure-versus-distance relationships. Noise data are provided for 15 helicopters, including five flight regimes each: takeoff, approach, level flyover, hover in-ground-effect (HIGE) and hover out-of-ground effect (HOGE). When possible, level flyover data are presented for a variety of airspeeds. Sound exposure level (SEL) is provided for all operational modes except hover. In the case of hover operations (both HOGE and HIGE), the maximum A-Weighted Sound Level (LAM) is identified as a function of distance. The report also includes a discussion of helicopter performance characteristics required for full computer modeling of helicopter/heliport noise exposure. Author (GRA)

N83-25501# Naval Coastal Systems Lab., Panama City, Fla.
REVERBERATION RESEARCH OVERVIEW
E. Moritz Nov. 1982 30 p refs
(AD-A123351; AD-F200045; NCSC-TM-362-82) Avail: NTIS HC A03/MF A01 CSCL 20/1

Prominent computational and theoretical approaches to the modeling of reverberation processes in the sea are reviewed. The work serves as a base line by documenting the work in reverberation since 1970 and the more didactic earlier works. One aim of the review is to identify the essential assumptions of the methodologies currently receiving attention. Additionally, the review identifies some areas that have been under utilized, e.g., zero and level crossing characteristics, and other areas that have benefitted from technological development such as echo-echo correlation and robust detection. Author (GRA)

N83-25502# Naval Surface Weapons Center, White Oak, Md. Research and Technology Dept.
DYNAMIC BEHAVIOR OF PARTICULATE VISCOELASTIC COMPOSITES FOR SOUND ABSORPTION
G. Gaunaurd and J. Barlow 18 Oct. 1982 67 p refs
(AD-A124272; AD-F500117; NSWC/TR-82-520) Avail: NTIS HC A04/MF A01 CSCL 20/1

We have developed a general frequency-dependent theory for the effective material properties (i.e., sound speed, attenuation, bulk, dilatational and shear moduli, etc.) of viscoelastic (i.e., sound absorbing) substances which contain ensembles of gas-filled cavities--assumed spherical for this analysis--of various concentrations and size distributions. The method accounts for the frequency dependence of the effective properties in a fundamental way based on the first principles of Mechanics, that permits the study of resonance effects present in all the spectra of all the effective properties we have determined. The method accounts for the primary interactions of the incident wave with all the cavities, although for the concentration levels considered here, re-scattering and multiple interaction between the various cavities have an effect of secondary magnitude. Our method accounts for the presence of any arbitrary level of dilatational and/or shear viscous absorption in the matrix (the fluid inclusions are assumed lossless) in a fundamental way emerging from basic viscoelastic continuum models such as Kelvin-Voight's. Numerous calculations have been generated at various absorption levels and for cases where the cavities are either all of the same uniform size or when they follow some simple size distribution function. GRA

N83-25503# Admiralty Marine Technology Establishment, Teddington (England).
ACOUSTIC INTENSITY VECTORS INSIDE INFINITE CYLINDRICAL ELASTIC SHELL
J. H. James Dec. 1982 22 p refs
(AD-A124259; AMTE(N)-TM82103; DRIC-BR-86369) Avail: NTIS HC A02/MF A01 CSCL 20/1

Integral transform formulas are given for the time-harmonic acoustic pressure and particle velocities from which the acoustic intensity vectors in the interior and exterior fluid may be calculated numerically. Some plots of interior intensity vectors due to point-force or point-source excitation demonstrate their potential usefulness as a visual aid to the understanding of wave propagation in fluid-filled pipes. Author

N83-25504# California Univ., Livermore. Lawrence Livermore Lab. Engineering Sciences Div.
DIGITAL ULTRASONIC SIGNAL PROCESSING TECHNIQUES USED FOR THE CLARIFICATION OF ULTRASONIC SIGNALS
Ronald L. McKinney Jul. 1982 6 p Presented at the Am. Soc. Non-Destructive Testing Conf., Philadelphia, 4-7 Oct. 1982
(Contract W-7405-eng-48)
(DE82-019244; UCRL-87805; CONF-821020-1) Avail: NTIS HC A02/MF A01

A curve fitting procedure which uses a cubic spline algorithm was investigated using digital ultrasonic signals for the purpose of digitally changing the original sample interval. Once an analog ultrasonic signal is digitized at one sample interval a set of cubic spline coefficients are calculated that specify the ordinate values of the signal at any sample interval. Specifying the sample interval allows more flexibility in three areas; one, specifying the maximum frequency and resolution when performing data transformations such as Fourier transforms; two, empirically determining the minimum number of datum required to specify ultrasonic signals; three, smoothing a given ultrasonic signal which will have an effect on the noise located within the signal. DOE

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-25505*# Stanford Univ., Calif. Inst. for Plasma Research.
EMISSION, ABSORPTION AND POLARIZATION OF GYROSYNCHROTRON RADIATION OF M!LDLY RELATIVISTIC PARTICLES
Vahe Petrosian and James M. McTiernan May 1983 22 p refs
(Grants NGR-05-020-668; NSG-7092; NSF ATM-81-16989)
(NASA-CR-170338; NAS 1.26:170338; SU-SUIPR-928) Avail: NTIS HC A02/MF A01 CSCL 20H

Approximate analytic expressions are presented for the emissivity and absorption coefficient of synchrotron radiation of mildly relativistic particles with an arbitrary energy spectrum and pitch angle distribution. From these, an expression for the degree of polarization is derived. The analytic results are compared with numerical results for both thermal and non-thermal (power law) distributions of particles. Author

N83-25506# Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
THE FO2 RADICAL AND LMR SPECTRA IN REACTIONS OF FLUORINE ATOMS
P. B. Davies, F. Temps, H. Gg. Wagner, and D. P. Stern (Cambridge Univ.) Dec. 1982 22 p refs
(ISSN-0436-1199) Avail: NTIS HC A02/MF A01

The far infrared laser magnetic resonance spectra of the FO2 radical were detected at eleven laser frequencies. The assignment is based on chemical and kinetic results and on a qualitative spectroscopic investigation. It is suggested that this radical may be responsible for many unassigned 5 micrometer and 10 micrometer laser magnetic resonance spectra. Author

N83-25507# Naval Research Lab., Washington, D. C. Plasma Physics Div.

ENERGY SCALING LAWS FOR THE RACETRACK INDUCTION ACCELERATOR Final Report

A. A. Mondelli (Science Applications, Inc.) and C. W. Roberson 29 Dec. 1982 31 p refs

(RR0110941)

(AD-A123659; NRL-MR-5008) Avail: NTIS HC A03/MF A01 CSCL 20/7

A high-current, cyclic electron accelerator, capable of accelerating several kiloamperes of electron current is described. The accelerating elements of the device are linear induction modules which match well to high-current operation. A racetrack configuration is utilized to return the electrons to the induction modules, thereby providing electron acceleration to an energy given by the gap voltage multiplied by the number of electron transits during the total pulse duration of the induction modules. Author (GRA)

N83-25508# Oak Ridge National Lab., Tenn. Physics Div.

ELASTIC SCATTERING AND INELASTIC SCATTERING OF 79.5 MeV 11B AND 87.5 MeV 10B

C. B. Fulmer, R. L. Auble, J. B. Ball, F. E. Bertrand, E. C. Gross, D. C. Hensley, S. Nukhopadhyay, and G. R. Satchler Feb. 1982 47 p refs

(Contract W-7405-eng-26)

(DE82-007791; ORNL/TM-8134) Avail: NTIS HC A03/MF A01

Differential cross sections are presented in graphs and tables for elastic scattering of 79.5-MeV B-11 ions on targets of Mg-24, Mg-25, Mg-26, Al-27, Co-59, Ni-60 and Au-197 and of 87.5-MeV B-10 ions on targets of Mg-14, Mg-25, and Ni-60. Angular distributions were measured approximately 10 deg c.m. in steps of 0.4 deg to approximately 50 deg c.m. for B-11 and to approximately 40 deg c.m. for B-10. Inelastic data for exciting the lowest 2(+) states of Mg-24, Mg-26, and Ni-60 were also obtained. DOE

N83-25509# California Univ., Berkeley. Lawrence Berkeley Lab.

COLLISIONS OF FAST HIGHLY CHARGED IONS IN GAS TARGETS: IONIZATION, RECOIL-ION PRODUCTION AND CHARGE TRANSFER

A. S. Schlachter, K. H. Berkner, H. F. Beyer, W. G. Graham, W. Groh, R. Mann, A. Mueller, R. E. Olson, R. V. Pyle, J. W. Stearns et al 1 Jul. 1982 26 p refs Presented at the Symp. on Production and Phys. of Highly Charged Ions, Stockholm, 1 Jun. 1982 Prepared in cooperation with Gesellschaft fuer Schwerionenforschung m.b.H, Giessen Univ. and Missouri Univ., Rolla Submitted for publication

(Contract DE-AC02-87ER-53128)

(DE82-020067; LBL-14658; CONF-8206110-1) Avail: NTIS HC A03/MF A01

Electron-capture, ionization, and recoil-ion-production cross sections were measured and calculated for fast highly charged projectiles in hydrogen and rare-gas targets. Recoil-ion-production cross sections are found to be large; the low energy and high charge states of the recoil ions make them useful for subsequent collision studies. DOE

N83-25510# Brookhaven National Lab., Upton, N. Y. National Nuclear Data Center.

MASSIVE OR WEIGHTY PROBLEM OF ATOMIC WEIGHT: IT'S A DIMENSIONLESS DILEMMA

Norman E. Holden 1982 6 p refs Presented at the 7th ACS Biennial Conf. on Chem. Education, Stillwater, Okla., 1 Aug. 1982

(Contract DE-AC02-76CH-00016)

(DE82-020741; BNL-NCS-31694; CONF-820863-1) Avail: NTIS HC A02/MF A01

An attempt is made to show that although mass and force are distinct, there is much ambiguity and often substitution between the words weight and mass. Semantically, the word atomic is at least as misused as weight. There is no rule that atomic weight must have the same dimensions as weight and there are a number of counterexamples in science with the word weight, which would disprove any such rule. If the term is not in error, it becomes merely one of a larger number of terms in science for which we could probably coin better names at this time. The switch from atomic weight to atomic mass would have the student trade one set of confusing problems for a new set of confusing problems. With no compelling reason to change, the weight of tradition should rule the day. DOE

N83-25511# California Univ., Berkeley. Lawrence Berkeley Lab.

DIGITAL NEUTRON RADIOGRAPHY USING PLANE CONVERTERS WITH MULTIWIRE PROPORTIONAL CHAMBERS

Selig N. Kaplan, Bruce A. Director, Victor Perez-Mendez, and Kenneth H. Valentine Dec. 1981 9 p refs Presented at the World Conf. on Neutron Radiography, San Diego, Calif., 7 Dec. 1981

(Contract DE-AC03-76SF-00098)

(DE82-020294; LBL-14714; CONF-811215-10) Avail: NTIS HC A02/MF A01

An effort to develop and study a moderately low cost, moderate resolution, high sensitivity, on-line method for digital neutron radiography, intended for use where neutron fluence was limited by source strength, or received dose is discussed. The basic imaging system consisted of a position-sensitive gas proportional chamber together with its associated imaging electronics, and a plane neutron converter. Enriched-boron, gadolinium, and polyethylene (for fast neutrons) converters were analyzed and tested. Some work was done on digital data enhancement, and efforts to improve spatial resolution included pressurizing the proportional-chamber gas to reduce the track lengths of the neutron-interaction products. DOE

N83-25512# California Univ., Livermore. Lawrence Livermore Lab.

A HYBRID CHARGED-PARTICLE GUIDE FOR STUDYING (N, CHARGED PARTICLE) REACTIONS

R. C. Haight, R. M. White, and S. J. Zinkle (Wisconsin Univ., Madison) 25 Aug. 1982 4 p refs Presented at the Nucl. Data for Sci. and Technol. Intern. Conf., Antwerp, 6-10 Sep. 1982

(Contract W-7405-eng-48)

(DE82-020864; UCRL-87279; CONF-820942-2) Avail: NTIS HC A02/MF A01

A transport system that is based both on magnetic lenses as well as electrostatic fields is discussed. The magnetic focusing of this charged particle guide is provided by six magnetic quadrupole lenses arranged in a CDCCDC sequence (in the vertical plane). The electrostatic field is produced by a wire at high voltage which stretches the length of the guide and is physically at the center of the magnetic axis. The magnetic lenses are used for charged particles above 5 MeV; the electrostatic guide is used for lower energies. This hybrid system possesses the excellent focusing and background rejection properties of other magnetic systems. For low energy charged particles, the electrostatic transport avoids the narrow band-passes in charged-particle energy which are a problem with purely magnetic transport systems. This system is installed at the LLNL Cyclograaff facility for the study of (n, charged particle) reactions at neutron energies up to 35 MeV. DOE

N83-25513# California Univ., Livermore. Lawrence Livermore Lab.

SCIENCE AND ART IN HEAVY-ION COLLISIONS

M. S. Weiss 9 Aug. 1982 19 p refs Presented at the Intern. Symp. on Time Dependent Hartree-Fock and Beyond, Bad Honnef, West Germany, 7-11 Jun. 1982

(Contract W-7405-eng-48)

(DE82-020497; UCRL-88037; CONF-820654-3) Avail: NTIS HC A02/MF A01

One of the more intriguing phenomena discovered in heavy ion physics is the seeming appearance of high energy structure in the excitation spectra of inelastically scattered heavy ions. For reasons illustrated, these may well be a phenomena unique to heavy ions and their explanation perhaps unique to three dimensional Hartree-Fock (TDHF). DOE

N83-25514# California Univ., Berkeley. Lawrence Berkeley Lab. Nuclear Science Div.
BEHAVIOR OF NUCLEI AT HIGH ANGULAR MOMENTUM
F. S. Stephens Jul. 1982 22 p refs Presented at the INS Symp. on Dyn. Nucl. Collective Motion, Mount Fuji, Japan, 6 Jul. 1982
(Contract DE-AC03-76SF-00098)
(DE82-020267; LBL-14641; CONF-820738-2) Avail: NTIS HC A02/MF A01

A brief overview of nuclear shapes and level structures at high spin values is reported. The new spectroscopy associated with angular momentum alignments is described, and some of the exciting possibilities of this spectroscopy are explored. Nuclear moments of inertia are discussed and a somewhat different one is defined, together with a method for measuring it and some early results. Finally a few comments on the future prospects for high spin physics are offered. DOE

N83-25515# Los Alamos Scientific Lab., N. Mex.
RAPID VIBRATIONAL AND ROTATIONAL ENERGY-TRANSFER RATES IN HEATED CARBON DIOXIDE COLLISIONS BY DOUBLE-RESONANCE LASER SPECTROSCOPY Thesis - Virginia Univ., Charlottesville
Michael David Thomason Jul. 1982 171 p refs
(Contract W-7405-eng-36)
(DE82-021844; LA-9420-T) Avail: NTIS HC A08/MF A01

Rates for resonant vibrational and rotational energy transfer from the 001 state by CO2 + CO2 collisions were measured. All data were obtained by double resonance spectroscopy with CO2 lasers in a 2.5 meter absorption cell at 700 K. Results for rotation transfer include pumped level relaxation and the response of other 001 levels with delta up to 18. These data are compared to four relevant collision models via a 35 level rate equation analysis. Sequence band (002 yields 101) and hot band (011 yields 110) lasing were used to observe resonant nu3 transfer relaxation involving 001 + 001 reversible 002 + 000, 001 + 100 reversible 101 + 000, and 001 + 010 reversible 011 + 000. A multilevel rate analysis was utilized to determine the rate coefficients for 001 going to the 002, the 101, and the 011 levels. Part of the hot band data is interpreted as due to 110 + 000 reversible 100 + 010, and the associated rate constant is estimated. Results are compared to the theory and to other experiments. DOE

N83-25516# Texas A&M Univ., College Station. Dept. of Physics.
COLLISIONALLY EXCITED FEW-ELECTRON SYSTEMS: THEORETICAL INTRODUCTION AND SURVEY
A. L. Ford, J. F. Reading, and R. L. Becker (ORNL) 1982 13 p refs Presented at the Intern. Conf. on X-ray and Atomic Innershell Phys., Eugene, Oreg., 23 Aug. 1982 Sponsored in part by the Center for Energy and Mineral Resources
(Contract W-7405-eng-26; Grant NSF PHY-79-09146)
(DE82-020805; CONF-820855-1) Avail: NTIS HC A02/MF A01

Excitation, ionization, and charge transfer in collisions of protons (and antiprotons) with the single electron targets H, He(+) and Li(2+) are considered. These collisions are first compared to other types of ion-atom collisions. Both large charge transfer and ionization probabilities are allowed for while retaining the computational efficiency that allows a variety of collision partners and collision energies to be considered. The qualitative features of the various inelastic cross sections are discussed, in particular how they scale with collision energy, target nuclear charge, and the sign of the projectile charge. DOE

N83-25517# Oak Ridge National Lab., Tenn. Chemical Physics Sect.
NEGATIVE-ION STATES
R. N. Compton 1982 57 p refs Presented at the NATO Conf. on Photophys. and Photochem. in the Vacuum Ultraviolet, Lake Geneva, Wisc., 15-29 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020832; CONF-820853-3) Avail: NTIS HC A04/MF A01

Properties of atomic and molecular negative ions and their excited states are discussed. Experiments involving photon reactions with negative ions and polar dissociation are summarized. DOE

N83-25518# California Univ., Livermore. Lawrence Livermore Lab.
LINEAR AND NON-LINEAR CALCULATIONS OF THE HOSE INSTABILITY IN THE ION-FOCUSED REGIME
H. Lee Buchanan 14 Jun. 1982 23 p refs
(Contract W-7405-eng-48; ARPA Order 9345)
(DE82-021549; UCID-19495) Avail: NTIS HC A02/MF A01

A simple model is adopted to study the hose instability of an intense relativistic electron beam in a partially neutralized, low density ion channel (ion focused regime). Equations of motion for the beam and the channel are derived and linearized to obtain an approximate dispersion relation. The nonlinear equations of motion are then solved numerically and the results compared to linearized data. DOE

N83-25519# Pennsylvania State Univ., University Park. Dept. of Chemistry.
PHYSICAL ADSORPTION: RARE-GAS ATOMS ON SOLID SURFACES Final Report, 1 Jun. 1980 - 30 Sep. 1982
Milton W. Cole Sep. 1982 11 p refs
(Contract DE-AC02-79ER-10454)
(DE83-000241; DOE/ER-10454/T1) Avail: NTIS HC A02/MF A01

The areas of major progress are a quantitative understanding of band structure effects for He on graphite, the substrate modification of the He-He interaction on graphite, the nature of a universal physisorption potential, and the asymptotic coefficient C3 of the van der Waals interaction between an atom and a surface. These calculations have been largely confirmed by very precise experiments, indicating the growing sophistication of this field. Their conclusions can be generalized and extended to a variety of other systems and problems. DOE

N83-25520# Oak Ridge National Lab., Tenn. Chemical Physics Section.
PRODUCTION AND REACTIONS OF NEGATIVE IONS
R. N. Compton 1982 19 p refs Presented at the NATO Conf. on Photophys. and Photochem. in the Vacuum Ultraviolet, Lake Geneva, Wisc., 15 Aug. 1982
(Contract W-7405-eng-26)
(DE82-020824; CONF-820853-1) Avail: NTIS HC A02/MF A01

Negative ions play a role in photophysics and photochemistry. Negative ion properties and reactions in the gas phase are discussed. Electron affinities, photoabsorption by negative ions, production of negative ions by photon reactions, and collision of high Rydberg atoms with electron-attaching molecules and the possible influence of dipole bound states are discussed. DOE

N83-25521# Brookhaven National Lab., Upton, N. Y.
GENERATORS OF COHERENT RADIATION FROM RELATIVISTIC ELECTRONS
C. Pellegrini 1982 10 p refs Presented at the Conf. on New Horizons in Electromagnetic Phys., Charlottesville, Va., 21 Apr. 1982 Submitted for publication
(Contract DE-AC02-76CH-00016)
(DE82-020370; BNL-31684; CONF-820475-1) Avail: NTIS HC A02/MF A01

The production of coherent electromagnetic radiation from an electron beam in a storage ring is discussed along with some of the possible applications of this radiation. Coherent radiation production can be obtained with a free electron laser and this gives a number of photons per unit time and wavelength six or more order of magnitude larger than that obtained from incoherent synchrotron radiation. The use of a free electron laser to produce a nearly monochromatic gamma ray beams by Compton backscattering on an electron beam of a storage ring is considered. DOE

N83-25522# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

APPLICATION OF ROBERTSON'S COLLECTIVE FOCUSING TO FINAL FOCUSING
Geoffrey Krafft Sep. 1982 25 p refs
(Contract DE-AC03-76SF-00098)
(DE83-004050; LBL-14800) Avail: NTIS HC A02/MF A01

Recently Robertson suggested that a collective focusing scheme might be useful in the final focusing problem for Heavy Ion Fusion. He demonstrates that it is possible to focus a charge and current neutralized beam, and shows this scheme is applicable since HIF scenarios have current requirements smaller than the electron Alfven current. In this note ion emmittance is included in the analysis of such lenses. It is found that one can focus an acceptable fraction of the beam, provided the current density is large enough. DOE

N83-25523# North Carolina Univ., Chapel Hill. Dept. of Physics.
INNER SHELLS AS A LINK BETWEEN ATOMIC AND NUCLEAR PHYSICS
Eugen Merzbacher 1982 12 p refs Presented at the Intern. Conf. on X-ray and Atomic Inner-Shell Phys., Eugene, Oreg., 23 Aug. 1982
(Contract DE-AS05-76ER-02408)
(DE83-004560; DOE/ER-02408/210; ORO-2408-210; CONF-820855-6) Avail: NTIS HC A02/MF A01

Excitation or ionization of initially filled inner shells, really or virtually, may modify nuclear Q values, will require correction to measured beta decay endpoint energies, and can permit the use of inner shell transitions in the determination of nuclear widths. Improvements in resolution continue to enhance the importance of these effects. There is also beginning to appear experimental evidence of the dynamical effects of atomic electrons on the course of nuclear reactions. The dynamics of a nuclear reaction, which influences and may in turn be influenced by atomic electrons in inner shells, offers instructive examples of the interplay between strong and electromagnetic interactions and raises interesting questions about coherence properties of particle beams. A variety of significantly different collision regimes, depending on the atomic numbers of the collision partners and the collision velocity, are discussed and illustrated. DOE

N83-25524# Oak Ridge National Lab., Tenn.
EFFECTS OF LOW-ENERGY-ELECTRON-CAPTURE COLLISIONS (H0 + C/SUP N+) ON THE PARTICLE AND ENERGY BALANCE OF TOKAMAK PLASMAS
John T. Hogan 1981 14 p refs Presented at the 12th IPEAC Intern. Conf. on the Phys. of Electron. and Atomic Collisions, Gatlinburg, Tenn., 15 Jul. 1981
(Contract W-7405-eng-26)
(DE82-018263; CONF-810754-4) Avail: NTIS HC A02/MF A01

To illustrate the way in which atomic data provides enlightenment in the search for understandable (and thus extrapolable) confinement models, we restrict our scope to electron capture collisions involving H0 and multiply-charged ions. Many such foreign (impurity) multiply-charged ion species are found in plasma discharges, as a result of gas recycling and damage to the surrounding surfaces by energetic plasma particles. Typical low-Z ions are carbon and oxygen; the major constituents of the stainless steel wall (Fe, Ni, Cr) are intermediate impurities, while high-Z impurities (Mo, W) enter from limiter plates which constrict the hot plasma zone to reduce direct plasma-wall contact. In this discussion, however, attention will be given only to applications of data involving H0 + C/sup n+/ yields H+ + C/sup (n-1) +/ reactions with energy 10 eV to 2 keV. This energy range is typical of the plasma edge in present devices. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-25525*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NUCLEON AND DEUTERON SCATTERING CROSS SECTIONS FROM 25 Mv/NUCLEON TO 22.5 GeV/NUCLEON
Lawrence W. Townsend (Old Dominion Univ.), John W. Wilson, and Hari B. Bidasaria May 1983 26 p refs
(NASA-TM-84636; L-15596; NAS 1.15:84636) Avail: NTIS HC A02/MF A01 CSCL 20H

Within the context of a double-folding optical potential approximation to the exact nucleus-nucleus multiple-scattering series, eikonal scattering theory is used to generate tables of nucleon and deuteron total and absorption cross sections at kinetic energies between 25 MeV/nucleon and 22.5 GeV/nucleon for use in cosmic-ray transport and shielding studies. Comparisons of predictions for nucleon-nucleus and deuteron-nucleus absorption and total cross sections with experimental data are also made. Author

N83-25526# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.
ELECTRON BEAM PROBE FOR CHARGE NEUTRALIZATION STUDIES OF HEAVY ION BEAMS
J. Shiloh, M. Lampel, and R. Sah Jun. 1982 14 p refs
(Contract DE-AC03-76SF-00098)
(LBL-14391) Avail: NTIS HC A02/MF A01

The design and operation of an Electron Beam Probe for ion beam diagnostics is described. Advantages of this method for the analysis of space charge neutralization studies are discussed and examples of its applications to heavy ion beams are shown. Author

N83-25527# Pacific Northwest Lab., Richland, Wash.
WET STORAGE OF SPENT FUEL
W. J. Bailey and A. B. Johnson, Jr. Apr. 1982 12 p
(Contract DE-AC06-76RL-01830)
(DE82-014846; PNL-SA-10385-A) Avail: NTIS HC A02/MF A01

The status of wet storage of spent fuels is outlined. The following information is presented: number of LWR fuel assemblies in wet storage; location, type, cladding and failed fuel of stored spent fuel assemblies; storage capabilities; current trend (extend burnup); basis for assessing spent fuel behavior in wet storage; handling operations with spent fuel. No problems were encountered in the storage of spent fuels in pools, and there is not evidence of fuel cladding degrading in wet storage. DOE

N83-25528# Pacific Northwest Lab., Richland, Wash.
WASTE GLASSES-REQUIREMENTS AND CHARACTERISTICS
J. E. Mendel Apr. 1982 16 p refs Presented at the ANS Topical Meeting on Treatment and Handling of Radioactive Wastes, Richland, Wash., 19 Apr. 1982
(Contract DE-AC06-76RL-01830)
(DE82-014855; PNL-SA-10365; CONF-820424-23) Avail: NTIS HC A02/MF A01

The regulatory requirements relating to waste glass are reviewed. These requirements assume that waste glass is considered as a subcomponent of a waste package. Waste package concepts are described and the important characteristics of waste glass are summarized, with emphasis on the status of standardizing methods for measuring the characteristics of waste glass. DOE

N83-25529# Los Alamos Scientific Lab., N. Mex.
FLIGHT SYSTEMS SAFETY PROGRAM Progress Report
S. E. Bronisz, comp. Jul. 1982 15 p
(Contract W-7405-eng-36)
(DE82-021833; LA-9476-PR) Avail: NTIS HC A02/MF A01

This technical monthly report covers studies related to the use of PuO2 (238) in radioisotope power systems carried out for the Office of Coordination and Special Projects of the US Department of Energy by Los Alamos National Laboratory. Most of the studies discussed here are ongoing. Results and conclusions described may change as the work continues. Published reference of the results cited should not be made without the explicit permission of the person in charge of the work. DOE

N83-25530# California Univ., Livermore. Lawrence Livermore Lab.
NUCLEAR-WASTE DISPOSAL IN GEOLOGIC REPOSITORIES
D. Isherwood 2 Aug. 1982 17 p Presented at the Soc. of Civil Eng. The Geotechnics of Waste Management, Philadelphia, 19 Jan. 1982
(Contract W-7405-eng-48)
(DE82-020176; UCRL-86582; CONF-820154-1) Avail: NTIS HC A02/MF A01

Deep geologic repositories are widely studied as the most favored method of disposal of nuclear waste. Scientists search for repository sites in salt, basalt, tuff and granite that are geologically and hydrologically suitable. The systematic evaluation of the safety and reliability of deep geologic disposal centers around the concept of interacting multiple barriers. The simplest element to describe of the geologic barrier is the physical isolation of the waste in a remote region at some depth within the rock unit. Of greater complexity is the hydrologic barrier which is determined by the waste dilution factors and ground water flow rates. The least understood is the geochemical barrier, identified as a series of waste/water/rock interactions involving sorption, membrane filtration, precipitation and complexing. In addition to the natural barriers are the engineered barriers, which include the waste form and waste package. DOE

N83-25531# Mound Lab., Miamisburg, Ohio.
PELLETIZED-WASTE-FORM DEMONSTRATION PROGRAM, OCTOBER 1981 - MARCH 1982
Edward L. Lewis and Robert F. Herbert, Jr. 25 May 1982 6 p ref
(Contract DE-AC04-76DP-00053)
(DE82-015832; MLM-2938) Avail: NTIS HC A02/MF A01

The performance testing of plutonium-238 oxide spiked waste/cement pellets was continued. All fractional leach rates observed were normal with one exception. The leach rate of ash/cement pellets in deionized water was approx. 40 times normal due to a freeze/thaw of the leachant when the building heating system failed. The hot demonstration of the production pelletization line was accomplished with few difficulties. Three types of pellets were produced at a 96% pellet acceptance rate. The pelletization problems experienced with calcined ash of very fine average particle size were solved by the addition of 25 to 30 mesh/in. sand (SiO2). The transportability (vibration) testing of approx. 100 NCi/g ash/cement pellets proved that the stacked method was much superior to the random configuration. The amount of fines generated during a 90-minute test was 100 times greater in the random test. DOE

N83-25532# Mound Lab., Miamisburg, Ohio.
DEVELOPMENT OF LOW-LEVEL LIQUID-WASTE-TREATMENT SYSTEMS, OCTOBER 1981 - MARCH 1982
Melvin K. Williams and C. Mark Colvin 28 May 1982 55 p refs
(Contract DE-AC04-76DP-00053)
(DE82-016255; MLM-2908) Avail: NTIS HC A04/MF A01

A plant design for a reverse osmosis (RO) membrane unit was completed. The design includes a conceptual diagram, specifications for a RO unit producing 40 gal/min of permeated product, a list of radioisotopes tested on RO units and the rejections achieved, a discussion of the principle of RO, a discussion of the upper limits of cation and anion concentrations (there are no lower limits), a discussion of membrane configurations and porosities, a discussion of factors affecting membranes, a section on calculating the membrane area needed for a particular application, and capital and operating cost calculations. The three factors found to affect the adsorption of cobalt on ion exchange resins were investigated in an interaction effects design experiment. These factors are solution pH, and sulfite and ammonium concentrations. Greater than 99% of the cobalt can usually be removed from solutions at a pH between 3 and 6. A design for an ion-exchange pilot plant was completed. DOE

N83-25533# Los Alamos Scientific Lab., N. Mex.
RADIOLYTIC EFFECTS ON ION EXCHANGERS DURING THE STORAGE OF RADIOACTIVE WASTES
K. K. S. Pillay and G. L. Palau 1982 8 p refs Presented at the Intern. Conf. on Radioactive Waste Management, Winnipeg, Manitoba, 12-15 Sep. 1982
(Contract W-7405-eng-36)
(DE82-019551; LA-UR-82-2281; CONF-820933-1) Avail: NTIS HC A02/MF A01

Two major literature surveys and a series of scoping experiments indicate that radiation decomposition of ion exchange materials has the potential for a variety of undesirable consequences. These include the ready dispersion of adsorbed radionuclides to the environment, corrosion and pressurization of waste canisters, and generation of flammable and explosive gases, as well as agglomeration of ion exchangers to a rigid monolith with the partitioning of a liquid phase. Some highlights of the literature surveys and the major findings of the experimental studies are reported. DOE

N83-25534# Los Alamos Scientific Lab., N. Mex.
DISPOSAL OF LIQUID RADIOACTIVE WASTES THROUGH WELLS OR SHAFTS
B. L. Perkins Jan. 1982 27 p refs
(Contract W-7405-eng-36)
(DE82-008944; LA-9142-MS) Avail: NTIS HC A03/MF A01

Liquids and, in some cases, suitable solids and/or entrapped gases can be disposed of by: (1) well injection into deep permeable strata, bounded by impermeable layers; (2) grout injection into an impermeable host rock, forming fractures in which the waste solidifies; and (3) slurrying into excavated subsurface cavities. Radioactive materials are presently being disposed of worldwide using all three techniques; however, it would appear that if the techniques were verified as posing minimum hazards to the environment and suitable site-specific host rock were identified, these disposal techniques could be more widely used. DOE

N83-25535# California Univ., Livermore. Lawrence Livermore Lab.
MODELING OF NUCLEAR WASTE DISPOSAL BY ROCK MELTING
Francois E. Heuze Apr. 1982 10 p refs Presented at the 23rd US Symp. on Rock Mech., Berkeley, Calif., 25 Aug. 1982
(Contract W-7405-eng-48)
(DE82-012798; UCRL-87510; CONF-820803-3) Avail: NTIS HC A02/MF A01

The concept of deep disposal by rock melting (DRM) entails the injection of waste, in a cavity or borehole, 2 to 3 kilometers down in the Earth's crust. Granitic rocks are the prime candidate medium. The high thermal loading initially will melt the rock surrounding the waste. Following resolidification, a rock/waste matrix is formed, which should provide isolation for many years. The complex thermal, mechanical, and hydraulic aspects of DRM can be studied best by means of numerical models. The models must accommodate the coupling of the physical processes involved, and the temperature dependency of the granite properties, some of which are subject to abrupt discontinuities, during alpha-beta phase transition and melting. A strategy for such complex modeling is outlined. DOE

N83-25536# Monsanto Research Corp., Miamisburg, Ohio. Nuclear Waste Technology Section.
SUMMARY OF THE ULTRAFILTRATION, REVERSE OSMOSIS, AND ADSORBENTS PROJECT
C. Mark Colvin, Raymond C. Roberts, and Melvin K. Williams 24 Jan. 1983 44 p refs

(Contract DE-AC04-76DP-00053)
(DE83-005635; MLM-3033) Avail: NTIS HC A03/MF A01

The design for a medium size (40 gal/min) ultrafiltration (UF) membrane unit includes a schematic diagram, capital and operating costs, a list and discussion of the radioisotopes tested and the results achieved, operating parameters, and characteristics of the available membrane configurations. The plant design for a reverse osmosis (RO) membrane unit includes a conceptual diagram, specifications for a RO unit producing 40 gal/min of permeated product, a list of radioisotopes tested on RO units and the rejections achieved, a discussion of the principal of RO, a discussion of the upper limits of cation and anion concentrations (there are no lower limits), a discussion of membrane configurations and porosities, a discussion of factors affecting membranes, a section on calculating the membrane area needed for a particular application, and capital and operating cost calculations. The design for an ion exchange pilot plant includes a schematic diagram; flow, resin, and column specifications; impurity limits; and operating and capital costs. A short theoretical discussion and process description are also included. The design retains flexibility so that application to a specific stream can be determined. DOE

N83-24934# California Univ., Berkeley. Lawrence Berkeley Lab.
GEOLOGIC SYSTEMS AS ANALOGS FOR LONG-TERM RADIOACTIVE WASTE ISOLATION: INTRUSIVE-ROCK/COUNTRY-ROCK CONTACT ZONES
H. Wollenberg, D. Brookins (New Mexico Univ.), L. Cohen (California Univ.), S. Flexser, M. Abashian (New Mexico Univ.), and M. Shea *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 5-8 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24935# California Univ., Berkeley. Lawrence Berkeley Lab.
IRON-NICKEL ALLOYS AS CANISTER MATERIAL FOR RADIOACTIVE WASTE DISPOSAL IN UNDERGROUND REPOSITORIES
J. A. Apps *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 8-11 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24936# California Univ., Berkeley. Lawrence Berkeley Lab.
COUPLED HYDROLOGIC-THERMOMECHANICAL EXPERIMENTS FOR RADIOACTIVE WASTE ISOLATION
G. Korbin, H. Wollenberg, B. Strisower, C. R. Wilson, and T. Chan *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 11-14 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24937# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMAL IMPACT OF WASTE EMPLACEMENT AND SURFACE COOLING ASSOCIATED WITH GEOLOGIC DISPOSAL OF NUCLEAR WASTE
J. S. Y. Wang, D. C. Mangold, R. K. Spencer, and C. G. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 15-17 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24938# California Univ., Berkeley. Lawrence Berkeley Lab.
BASIS FOR A TENTATIVE THERMOHYDROLOGIC CRITERION FOR EMPLACEMENT DENSITY IN A NUCLEAR WASTE REPOSITORY
J. S. Y. Wang, D. C. Mangold, and C. F. Tsang *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 18-21 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24943# California Univ., Berkeley. Lawrence Berkeley Lab.
ASSESSMENT AND EVALUATION OF ENGINEERING OPTIONS AT A LOW-LEVEL RADIOACTIVE WASTE STORAGE SITE
B. Y. Kanehiro and V. Guvanasen *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 35-38 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24946# California Univ., Berkeley. Lawrence Berkeley Lab.
URANIUM (VI) RETARDATION MECHANISMS
R. J. Silva and A. W. Yee *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 45-47 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24947# California Univ., Berkeley. Lawrence Berkeley Lab.
SORPTIVE DIFFUSION IN CLAY GELS
J. A. Apps and C. J. Radke *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 48-49 ref (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24949# California Univ., Berkeley. Lawrence Berkeley Lab.
RESEARCH ON NUCLEAR WASTE ISOLATION AT STRIPA: AN OVERVIEW
P. A. Witherspoon, N. G. W. Cook, J. E. Gale, and C. R. Wilson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 53-55 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24950# California Univ., Berkeley. Lawrence Berkeley Lab.
RADIOGEOLOGIC ASSESSMENT FOR NUCLEAR WASTE ISOLATION: STUDIES OF THE STRIPA PLUTON
H. Wollenberg, S. Flexser, and L. Andersson *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 56-58 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24986# California Univ., Berkeley. Lawrence Berkeley Lab.
CHEMISTRY OF NUCLEAR WASTE SUBSTANCES IN AQUEOUS SOLUTIONS
S. L. Phillips and A. Igbene *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 163-165 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

74 OPTICS

Includes light phenomena.

N83-25537*# Perkin-Elmer Corp., Norwalk, Conn. Optical Group.
AXAF TECHNOLOGY MIRROR ASSEMBLY. AXAF/TMA PARABOLA AND HYPERBOLA GENERATING REPORT Final Report
John Russo Mar. 1983 26 p
(Contract NAS8-34579)
(NASA-CR-170742; NAS 1.26:170742; AX-122) Avail: NTIS HC A03/MF A01 CSCL 20F

The generation of the Advanced X-ray Astrophysics Facility/TMA hyperbolic and parabolic optical mirror blanks, the process used, and the final measurements are described. Author

N83-25538*# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
GUIDANCE AND CONTROL OF MIR TDL RADIATION VIA FLEXIBLE HOLLOW METALLIC RECTANGULAR PIPES AND FIBERS FOR POSSIBLE LHS AND OTHER OPTICAL SYSTEM COMPACTION AND INTEGRATION Final Report
Chung Yu 1983 175 p refs
(Grant NAG1-82)
(NASA-CR-170344; NAS 1.26:170344) Avail: NTIS HC A08/MF A01 CSCL 20F

Flexible hollow metallic rectangular pipes and infrared fibers are proposed as alternate media for collection, guidance and manipulation of mid-infrared tunable diode laser (TDL) radiation. Certain features of such media are found to be useful for control of TDL far field patterns, polarization and possibly intensity fluctuations. Such improvement in dimension compatibility may eventually lead to laser heterodyne spectroscopy (LHS) and optical communication system compaction and integration. Infrared optical fiber and the compound parabolic coupling of light into a hollow pipe waveguide are discussed as well as the design of the waveguide. A.R.H.

N83-25539*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
MINIATURE ELECTRO-OPTICAL AIR FLOW SENSOR Patent Application
David D. Kershner, inventor (to NASA) Filed 14 Apr. 1983 15 p (NASA-Case-LAR-13065-1; US-Patent-Appl-SN-484745) Avail: NTIS HC A02/MF A01 CSCL 20F

A sensor for measuring flow direction and airspeed is disclosed that is suitable, because of its small size, for rapid instrumentation of research airplanes. A propeller driven sphere rotating at a speed proportional to airspeed presents a reflective target to an electro-optical system. The duty cycle of the resulting electrical output is proportional to yaw angle and the frequency is proportional to airspeed. NASA

N83-25540*# National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD FOR MAKING A BONDED SINGLE MODE FIBER OPTIC WAVELENGTH COUPLER Patent Application
Willis C. Goss (JPL, California Inst. of Tech., Pasadena), Mark D. Nelson (JPL, California Inst. of Tech., Pasadena), and John M. McLauchlan, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 26 Jan. 1983 16 p Sponsored by NASA (NASA-Case-NPO-15464-1; US-Patent-Appl-SN-342828) Avail: NTIS HC A02/MF A01 CSCL 20F

Simple techniques are described for coupling optic fibers for coherently transmitting light from one to the other. Two optical fibers are mounted on a block (such as a microscope slide with a hole) to extend across the hole. The arrangement is immersed in an etchant bath to reduce the thickness of the cladding of the fibers. The fibers are then coupled by running a drop of liquid plastic along the fibers. This zips the fibers together by the surface tension of the liquid plastic, and leaves a thin plastic film on the fibers. When the film hardens, the two fibers are held together. The same zipper action occurs when the block and fiber arrangement is pulled from a liquid bath in an angular direction. In a second technique, weights are hung on one fiber to deflect it against the other, and the fiber claddings are arc welded together. NASA

N83-25541*# National Aeronautics and Space Administration. Pasadena Office, Calif.
OPTICAL SYSTEM Patent Application
James B. Breckinridge (JPL, California Inst. of Tech., Pasadena), Norman A. Page (JPL, California Inst. of Tech., Pasadena), Roland V. Shack (JPL, California Inst. of Tech., Pasadena), and Robert R. Shannon, inventors (to NASA) (JPL, California Inst. of Tech., Pasadena) Filed 23 Mar. 1983 24 p
(Contract NAS7-100)
(NASA-Case-NPO-15801-1; US-Patent-Appl-SN-478130) Avail: NTIS HC A02/MF A01 CSCL 20F

An optical system used in a spacecraft to observe a remote surface and provide a spatial and spectral image of this surface is disclosed. The system includes aspheric and spherical mirrors aligned to focus at a first optical plane an image of the surface, and a mirror at this first focal plane which reflects light back on to the spherical mirror. This spherical mirror collimates the light and directs it through a prism which disperses it. The dispersed light is then focused on an array of light responsive elements disposed at a second focal plane. The prism is designed such that it disperses light into components of different wavelengths, with the components of longer wavelengths to present at the second focal plane a distribution pattern in which preselected groupings of the components are dispersed over essentially equal spacing intervals. NASA

N83-25542*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
ROTARY TARGET V-BLOCK Patent Application
Charlton W. Mann, inventor (to NASA) Filed 26 Feb. 1982 12 p (NASA-Case-LAR-12007-3; US-Patent-Appl-SN-352831) Avail: NTIS HC A01/MF A01 CSCL 20F

A device used in the optical alignment of machinery to maintain a measuring scale in the proper position for optical readings to be taken is described. The device consists of a block containing a notch in the shape of an inverted 'v' and a rotatable plug positioned over the centerline of notch. The block is placed on the object to be aligned, the notch allows the block to be securely placed upon flat or curved surfaces. A weighted measuring scale is inserted through plug so that it contacts the object to be aligned. The scale and plug combination can be rotated so that the scale faces an optical aligning instrument. The instrument is then used in conjunction with the scale to measure the distance of the machinery from a reference plane. NASA

N83-25543*# Alabama A & M Univ., Normal.
REDUCTION OF THE ONE-DIMENSIONAL X-RAY SCATTERING DATA ON MIRROR FLATS AT NASA/MARSHALL SPACE FLIGHT CENTER
Alton C. Williams Nov. 1981 18 p
(Contract NAS8-34591)
(NASA-CR-170749; NAS 1.26:170749; TR-1) Avail: NTIS HC A02/MF A01 CSCL 20F

Data on the scattering of X-rays from various mirror flats obtained from different vendors. The scattering data discussed in this section is obtained by a one dimensional proportional counter at X-ray energies of 8.06, 6.4 and 2.99 keV. X-rays are generated at one end of a 312.4m long tube which is under vacuum. This long tube provides a parallel beam of X-rays which is then collimated by a slit and allowed to scatter from a pair of mirror flats at small grazing angles of incidence. The slit and mirrors assembly is placed 182.4 meters from the other end of the tube where the proportional counter detector is located. The detector is sitting on an optical table which is pivoted so that it can rotate to intercept X-rays at a range of spatial locations. The optical table pivot is located 2.78 meters in front of the detector, and has an operational angular range of 350 arc minutes. Measured from the position of the mirror, this total angular range of the data is (350) (2.78/182.4) = 5.33 arcminutes. Author

N83-25544*# Alabama A & M Univ., Normal.
RELATIONS BETWEEN MIRROR FLATS GEOMETRY AND X-RAY DATA
Alton C. Williams Jan. 1982 13 p
(Contract NAS8-34591)
(NASA-CR-170750; NAS 1.26:170750; TR-2) Avail: NTIS HC A02/MF A01 CSCL 20F

The X-ray data is used to determine the position where the mirror flats are properly aligned. The zero angle of incidence position of the mirrors is determined with the data. The mirrors are in the periscope geometry. However, the value of S sub T, the distance from the slit to the plane of the short mirror, is not fixed nor known a priori. This parameter plays a very important role in the zero position of the mirrors. As a further complicating factor, it is possible that the mirrors are not parallel. That is, they may be cocked by some angles alpha and beta, respectively. The relation between the X-ray data and the geometry of the mirrors is given. The experimental errors are given in terms of known or measured parameters. Author

N83-25545*# Smithsonian Astrophysical Observatory, Cambridge, Mass.
FEASIBILITY STUDY OF AN OPTICALLY COHERENT TELESCOPE ARRAY IN SPACE Final Report, 19 May 1980 - 31 Dec. 1982

Wesley A. Traub Feb. 1983 236 p refs
(Contract NAS8-33893)
(NASA-CR-170758; NAS 1.26:170758; TR-2) Avail: NTIS HC A11/MF A01 CSCL 20F

Numerical methods of image construction which can be used to produce very high angular resolution images at optical wavelengths of astronomical objects from an orbiting array of telescopes are discussed and a concept is presented for a phase-coherent optical telescope array which may be deployed by space shuttle in the 1990's. The system would start as a four-element linear array with a 12 m baseline. The initial module is a minimum redundant array with a photon-counting collecting area three times larger than space telescope and a one dimensional resolution of better than 0.01 arc seconds in the visible range. Later additions to the array would build up facility capability. The advantages of a VLBI observatory in space are considered as well as apertures for the telescopes. A.R.H.

N83-25546# Environmental Research Inst. of Michigan, Ann Arbor.
THREE-DIMENSIONAL VISION SYSTEM FOR THE ADAPTIVE SUSPENSION VEHICLE Final Report
David M. Zuk and Mark I. DellEva Jan. 1983 77 p
(Contract MDA903-82-C-0119; ARPA Order 4468)
(AD-A124277; ERIM-170400-3-F) Avail: NTIS HC A05/MF A01 CSCL 20/6

This report documents the collection of simulated three-dimensional (3D) terrain data, and the conceptual design of a 3D vision system for the 84 Adaptive Suspension Vehicle (ASV). Descriptions of the 10 scenes on which 3D data was collected are presented along with some samples of 3D data. The results of the conceptual design are included and specifications for the ASV vision module are presented. Author (GRA)

N83-25547# Keo Consultants, Brookline, Mass.
LOW LIGHT LEVEL IMAGING DESIGN
R. H. Eather Hanscom AFB, Mass. AFGL 1 Oct. 1982 17 p
(Contract F19628-80-C-0153; AF Proj. 4643)
(AD-A124283; AFGL-TR-82-0308) Avail: NTIS HC A02/MF A01 CSCL 09/1

Low-light level imaging design involves evaluation of a number of variables that affect overall gain. Most systems include an image intensifier and some sort of recording device, such as film, a CCD array, or a TV camera. A list of factors that should be considered in design includes (though may not be limited to) input lens speed, filter transmission, spectral response of image intensifier, image intensifier gain, output phosphor spectral distribution, relay lens speed or fibre optics transmission, film speed (if used) or CCD or TV camera characteristics such as spectral response, sensitivity, and integration capability. One normally has to rely on manufacturers' technical data for many of the above parameters, and these are often quoted in inconvenient or unfamiliar photometric units, often at an unspecified resolution. As a result, quoted gains or sensitivities of electro-optical devices may bear little relation to the specific problem being considered. The purpose of this Report is to illustrate design calculations for a typical LLL imaging system that might be used in auroral or airglow research, and to provide appropriate explanations and definitions of the physical units one encounters in such calculations. GRA

N83-25548# Rome Air Development Center, Griffiss AFB, N.Y.
FIBER OPTIC TRANSCEIVER THERMAL ANALYSIS
Seymour F. Morris and Douglas J. Holzhauer Nov. 1982 77 p refs
(AF Proj. 4519)
(AD-A123532; RADC-TR-82-285) Avail: NTIS HC A05/MF A01 CSCL 20/6

This report documents the thermal analysis done by the Systems Engineering Section in support of the in-house Air Support Operations Center (ASOC) Fiber Optic Remoting Project. The purpose of the ASOC project was to develop a fiber optic transceiver that would allow ASOC systems to replace the 26 pair metallic cable with the much lighter dual fiber optic cable. In support of this project, RBES used computer aided thermal analysis and laboratory thermal measurement to design and verify the thermal design of the ASOC experimental module. Author (GRA)

N83-25549# Army Armament Research and Development Command, Dover, N. J. Large Caliber Weapon Systems Lab.
COMPARISON OF THE OPTICAL REFLECTIVITY OF A SHOCK FRONT IN LIQUID WATER AND IN LIQUID NITROMETHANE Technical Report, period ending FY82
Paul Harris and Henri-Noel Presles Nov. 1982 26 p refs
(DA Proj. 1L1-61101-A-91A)
(AD-A123366; AD-E400938; ARLCD-TR-82025) Avail: NTIS HC A03/MF A01 CSCL 19/1

Shock front optical reflectivity data for liquid water at 5.8 kbar and for liquid nitromethane at 6.0 kbar are analyzed with a reflectivity theory containing reflection within the shock front. Comparison of the analyses for water and for nitromethane leads to the conclusion that additional physics is necessary to explain the nitromethane data. It is suggested that the experimental-theoretical discrepancy for nitromethane is optical-path-length dependent, and that discrepancy is possibly due to thermal fluctuations related to explosive chemistry. GRA

N83-25550# Hughes Research Labs., Malibu, Calif.
OPTICAL TIME DOMAIN REFLECTOMETRY FIBER STUDIES Final Report
M. D. Rourke and H. W. Yen Griffiss AFB, N.Y. RADC Oct. 1982 84 p refs
(Contract F19628-79-C-0172; AF Proj. 7820)
(AD-A123682; RADC-TR-82-281) Avail: NTIS HC A05/MF A01 CSCL 20/6

The wideband frequency capability of optical fibers, the development of very low loss optical fibers (<1 dB/km) and the rapid development of associated optical circuit elements are expected to result in widespread use of optical fiber communication systems in the near future. However, hostile intrusion into these fiber links requires immediate attention and studies, along with a method for detecting these intrusions before hard standards for secure fiber links can be set. The program goal is to develop the OTDR for intrusion monitoring and to establish its ultimate performance limits. An additional objective is to identify and catalog OTDR signatures of different potential intrusions. Large as well as small amplitude microbend in a step-index waveguide can easily be located and measured with the OTDR. A single microbend less than 10 micrometer in amplitude and a periodic microbend approximately 40 periods) of amplitude less than 2 microns were detectable with a computer OTDR test set. Author (GRA)

N83-25551# Sperry Univac, St. Paul, Minn. Defense Systems Div.
ALTERABLE MAGNETIC GRATINGS FOR FIBER OPTIC SWITCHING Final Report, Jul. 1980 - Dec. 1982
Gerald F. Sauter, John A. Krawczak, Gary L. Nelson, and Fred G. Hewitt Dec. 1982 91 p refs
(Contract DAAG29-80-C-0134)
(AD-A123571; PX-14014; ARO-17201.2-EL) Avail: NTIS HC A05/MF A01 CSCL 17/2

Optical mode switching of fiber light can enhance the capability of fiber optic communications systems by eliminating opto-electronic-opto converters at switching nodes and by performing the switching even on crosstalk-prone high data rate channels. During this program several aspects of the stripe domain alterable grating were studied in a fiber optic switch mode.
Author (GRA)

N83-25552# SRI International Corp., Menlo Park, Calif. Artificial Intelligence Center.
RECOVERING INTRINSIC SCENE CHARACTERISTICS FROM IMAGES Final Report, 28 Sep. 1981 - 27 Sep. 1982
Martin A. Fischler 17 Dec. 1982 96 p refs
(Contract DAAG29-79-C-0216; ARPA Order 2894; SRI Proj. 1019)
(AD-A123185; ARO-17127.5-EL-A) Avail: NTIS HC A05/MF A01 CSCL 20/6

The central theme of the research effort described in this report is the recovery of information about the three-dimensional structure and physical characteristics of the surfaces depicted in an image -their shapes, locations, and photometric properties. Our approach has been to identify and model physically meaningful information that can either directly recover physical structure (e.g., models relating surface geometry to intensity variations visible in the image), or that can be used to constrain the interpretation process (e.g., camera and illumination models). In this report, we present new results concerning the question of how to recover the shape of a surface from its photometric variation in an image and a new method for skyline delineation. An essential feature of these techniques is that they are based entirely on physical models, and thus require no prior knowledge of the scene being analyzed. GRA

N83-25553# Howard Univ., Washington, D. C. Dept. of Chemistry.
RAMAN INVESTIGATION OF THE EFFECTS OF FUSED SILICA FIBERS
M. S. Hokmabadi and G. F. Walrafen 12 Jan. 1983 9 p refs
(Contract N00014-80-C-0305)
(AD-A123549; TR-14) Avail: NTIS HC A02/MF A01 CSCL 20/6

Raman spectra have been obtained from fused silica optical fibers under high reversible torsion. These results are compared to Raman results from fused silica, irreversibly compacted to 90 kbar. An interpretation is presented which suggests a negative correlation between the mean Si-O-Si bridging angle and the mean Si-O distance, plus a negative correlation between the mean Si-O-Si bridging angle and the mean tilt angle between SiO4 tetrahedra. Author (GRA)

N83-25554# Effects Technology, Inc., Santa Barbara, Calif.
INSTRUMENTATION AND DATA ACQUISITION FOR SATELLITE TESTING IN NUCLEAR ENVIRONMENTS Final Technical Report
Bhagwant Samyal and Walter Naumann 30 Jun. 1982 67 p refs
(Contract DNA001-81-C-0219; DNA Proj. X99-QAXV)
(AD-A123560; DNA-TR-81-48; ETI-CR-82-1081) Avail: NTIS HC A04/MF A01 CSCL 20/6

Electro-optic and magnetic-optic sensors for measurement of SGEMP-induced electromagnetic fields in and around a satellite in a UGT environment and a fiber optic data link suitable for relaying analog measurements inside the satellite to outside data collection devices are described. The electro-optic and magneto-optic sensors are based on the Pockels and Faraday Effects, respectively. The former has a sensitivity range of 10 to the second power - 10 to the 6th power v/m and the latter 1 x 10 to the minus 6th power - 34 x 10 to the minus 4th power Weber/meters square. Brief theoretical reviews and optical systems for the application of these sensors are presented. These sensors have several advantages over the conventional electrical sensors and they exhibit a great potential for measurement of electromagenetic fields. However, the effects of radiation on these sensors are uncertain and need to be assessed for any future development of these sensors. The fiber optic data link consists of several transmitter modules, located at the satellite, connected by optical fibers to the corresponding receiver modules located at a radiation safe alcove. GRA

N83-25555# Perkin-Elmer Corp., Danbury, Conn.
LIGHTWEIGHT ZERODUR MIRROR TECHNOLOGY Final Technical Report, 21 Sep. 1981 - 21 May 1982
George J. Gardopee and Da-Wun Shen Griffiss AFB, N.Y. RADC Oct. 1982 290 p
(Contract F30602-81-C-0281; ARPA Order 3503; AF Proj. C503)
(AD-A123538; RADC-TR-82-260; Rept-15512) Avail: NTIS HC A13/MF A01 CSCL 20/6

The manufacturing techniques applicable to the fabrication of lightweight passive mirror blanks from Zerodur glass-ceramic are demonstrated. The techniques include bending and welding Zerodur to form lightweight eggcrate cores and frit bonding thin facesheets to the cores. Physical property measurements show that the joints meet the requirements for a mirror blank design. The thermal performance of a lightweight Zerodur mirror is predicted analytically and is superior to the performance of conventional ULE mirrors. The cost and schedule for establishing a large mirror blank fabrication facility are estimated. Author (GRA)

N83-25556# SRI International Corp., Menlo Park, Calif. Remote Sensing Program.
REMOTE SENSING OF THE OPTICAL AND PHYSICAL DENSITIES OF SMOKE, DUST, AND WATER CLOUDS Final Report, Oct. 1979 - Oct. 1982
Edward E. Uthe Dec. 1982 41 p
(Contract DAAG29-80-C-0003; SRI Proj. 1335)
(AD-A124321; ARO-16692.3-GS) Avail: NTIS HC A03/MF A01 CSCL 20/6

A new van-mounted four-wavelength lidar system designed for remote aerosol characterization has been constructed and tested. The most important design criteria established for the new systems was that the laser pulses should view the same path and be emitted in a minimal time period in order to reduce effects of time-variant aerosol distributions on multiple-wavelength observations. Energy at 0.53-and 1.06 micro m wavelengths is transmitted into the atmosphere using a Nd:YAG laser; 3.8 micro m is transmitted using a DF laser, and 10.6 micro m is transmitted using a CO2 laser. An optical arrangement provides for transmitting the pulses along the same horizontal path, coaxial with a 12-inch-diameter Newtonian telescope. Wavelength-separation optics direct received energy to separate detectors for 0.53-and 1.06 micro m energy and to a common detector for 3.8- and 10.6 micro m energy. By deriving both 0.53-and 1.06 micro m laser emissions from a single flash lamp excitation, and by recording the four backscatter signatures within a single transient digitizer 2048-word record, the four signatures can be collected within a 160-micro m interval. Each four-wavelengths lidar record is transferred to an LSI 11/2 microcomputer and written on none-track magnetic tape, together with date and time information. SRI conducted a field test of the four-wavelength lidar to evaluate system performance in an environment similar to that of previous lidar operations at Army range facilities. The lidar van was located about 600 m from an 8-ft square passive reflector. GRA

N83-25557# Itek Corp., Lexington, Mass. Optical Systems Div.
VERTICALLY FUSED FACE SHEET PERFORMANCE Final Technical Report, 17 Jun. 1981 - 15 Jun. 1982
Harry M. Simmons and John W. Pepi Griffiss AFB, N.Y. RADC Oct. 1982 69 p
(Contract F30602-81-C-0223; ARPA Order 3503)
(AD-A123420; RADC-TR-82-261) Avail: NTIS HC A04/MF A01 CSCL 20/6

This study evaluates the performance of vertically fused face sheet mirrors used in adaptive optical systems that are subjected to high thermal irradiance. A one meter diameter by 20mm thick segmented, low expansion glass face sheet was fabricated from different boules of glass and characterized for material properties. The study includes thermal irradiation testing using interferometric measurements and detailed analytical modeling. Author (GRA)

N83-25558# Oak Ridge National Lab., Tenn. Solid State Div.
OPTICAL CONSTANTS FOR SILICON AT 300K AND 10K DETERMINED FROM 1.64 TO 4.73 eV BY ELLIPSOMETRY
G. E. Jellison, Jr. and F. A. Modine Feb. 1982 60 p refs
(Contract W-7405-eng-26)
(DE82-010062; ORNL/TM-8002) Avail: NTIS HC A04/MF A01

Polarization modulation ellipsometry was used to determine the optical constants of Si for photon energies from 1.64 to 4.73 eV (755 to 262 nm) at 300 K as well as 10 K. The results were interpreted using a two boundary, three layer model (air-SiO2-Si); the inclusion of an interface layer between the SiO2 and Si did not greatly affect the derived optical constants below approximately 3.5 eV. The accuracy of the results was carefully evaluated, the error in the index of refraction (n) being $< 1\%$, while the error in

the extinction coefficient (k) or the absorption coefficient (alpha) being dependent upon the magnitude, approximately 15% at alpha = 10,000 cm, approximately 6% at alpha = 100,000 cm, and approximately 1.5% at alpha = 1 million. The room temperature absorption coefficient results represent the best spectroscopically available values from 2.5 eV to 3.5 eV (350 to 500 nm), while the results at 10 K represent the best values available over the entire wavelength region measured. A comparison with published data is presented. DOE

N83-25559# Colorado Univ., Boulder. Dept. of Physics.
CRITICAL SCATTERING OF LASER LIGHT BY FLUID FILMS AND INTERFACES Final Progress Report, 1 Feb. 1980 - 31 Jan. 1982
Richard Mockler and William OSullivan 1982 14 p refs
(Contract DE-AC02-76ER-02203)
(DE82-020046; DOE/ER-02203/T1) Avail: NTIS HC A02/MF A01

The first intensity autocorrelation studies on thin critical fluid films was carried out on trapped films of a 2,6 Lutidine + water critical mixture. The scaled Rayleigh linewidth was measured for a range of k xi spanning both the hydrodynamic (k xi < < 1) and nonhydrodynamic regimes. Film thicknesses were 13.1, 4.1 and 2.1 micrometers. These studies showed that the critical dynamics of fluid films is indistinguishable from that of large samples, even under conditions such that the correlation length is > or = film thickness. A theory of the lattice dynamics of colloidal particle crystals was developed and verified by studies of the intensity and intensity autocorrelation of thermal diffuse scattered light measured about Bragg peaks. DOE

N83-25560# General Electric Co., Philadelphia, Pa. Advanced Energy Programs Dept.
DESIGN AND DEVELOPMENT OF A LAMINATED FRESNEL LENS FOR POINT-FOCUS PV SYSTEMS, PHASE 2
Ronald C. Hodge Dec. 1982 74 p
(Contract DE-AC04-76DP-00789)
(DE83-005935; SAND-82-7127) Avail: NTIS HC A04/MF A01

A laminated glass-plastic lens parquet using injection molded point focus Fresnel lenses is described. The cost effectiveness of a glass-plastic concentrator lens assembly is reported. The development of an improved lens design, a full size parquet lamination process, and a second group of injection molding lens molding trials are also discussed. DOE

N83-24887*# Martin Marietta Corp., Denver, Colo.
POLARIZER MECHANISM FOR THE SPACE TELESCOPE FAINT OBJECT SPECTROGRAPH
Mark D. Thulson *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 97-108 refs (For primary document see N83-24881 14-39)
(Contract NAS5-24463)
Avail: NTIS HC A17/MF A01 CSCL 20F

N83-24888*# National Aeronautics and Space Administration, Washington, D. C.
DESIGN OPTIMIZATION OF HIGH-PERFORMANCE ELECTRODYNAMIC ACTUATORS FOR USE IN A CRYOGENICALLY COOLED TELESCOPE
J.-N. Aubrun, K. R. Lorell, and K. P. Silveira *In* JPL The 17th Aerospace Mech. Symp. May 1983 p 109-120 refs (For primary document see N83-24881 14-39)
Avail: NTIS HC A17/MF A01 CSCL 20F

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.

For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N83-25561*# College of William and Mary, Williamsburg, Va.
[RESEARCH ON TURBULENCE IN PLASMA] Progress Report
[1982] 15 p refs
(NASA-CR-170260; NAS 1.26:170260) Avail: NTIS HC A02/MF A01 CSCL 20I

The plasma turbulence research program at William and Mary is discussed. The search has been less for phenomena to explain than for nontrivial magnetohydrodynamic processes in the fully turbulent domain that can be understood. Two examples are used to illustrate this: (1) development of anisotropy in the presence of a strong do magnetic field; and (2) the decay of an MHD turbulent field to a dynamically aligned state with velocity field and magnetic fields parallel or antiparallel. L.F.M.

N83-25562# Paris-Sud Univ., Orsay (France). Centre d'Etudes de Limeil.
A STUDY OF THE THERMAL AND SUPRATHERMAL FLUCTUATIONS OF THE ELECTRON DENSITY OF THE PLASMA IN THE FOCUS EXPERIMENT [ETUDE DES FLUCTUATIONS DE DENSITE ELECTRONIQUE THERMIQUES ET SUPRATHERMIQUES DU PLASMA DE L'EXPERIENCE FOCUS]
Alain Jolas 1982 223 p refs In FRENCH
(CEA-R-5153) Avail: NTIS HC A10/MF A01

Thomson scattering of the light of a ruby laser by the electrons of a laboratory plasma was achieved in an experiment. The scattered light was examined with high spatial and temporal resolution during the implosion phase of the plasma layer which preceeds the appearance of neutrons. The spectra of wave frequency and number of density fluctuations were measured as well as the angular distribution of the fluctuations for a given wave number. The temporal evolution of the scattered light signals were analyzed and smoothed. The plasma that implodes is constituted by a dense layer where density fluctuations are isotropic and have a thermal level and a plasma layer in which the fluctuations are anisotropic and purely suprathermal. The latter layer is attributed to microscopic instabilities engendered by the electric current which circulates in the transition zone where the magnetic field penetrates the plasma. A.R.H.

N83-25563*# Los Alamos Scientific Lab., N. Mex.
SIMULATION OF PLASMA DOUBLE-LAYER STRUCTURES
Joseph E. Borovsky and Glenn Joyce (Naval Research Lab., Washington, D.C.) 1982 7 p refs Presented at the Symp. on Plasma Double Layers, Roskilde, Denmark, 1 May 1982 Sponsored by NASA
(Contract W-7405-eng-36)
(NASA-CR-170279; NAS 1.26:170279: DE82-019536; LA-UR-82-2262; CONF-8205113-1) Avail: NTIS HC A02/MF A01 CSCL 20I

Electrostatic plasma double layers are numerically simulated by means of a magnetized 2 1/2 dimensional particle in cell method. The investigation of planar double layers indicates that these one dimensional potential structures are susceptible to periodic disruption by instabilities in the low potential plasmas. Only a slight increase in the double layer thickness with an increase in its obliqueness to the magnetic field is observed. Weak magnetization results in the double layer electric field alignment of accelerated particles and strong magnetization results in their magnetic field alignment. The numerical simulations of spatially periodic two dimensional double layers also exhibit cyclical instability. A morphological invariance in two dimensional double layers with respect to the degree of magnetization implies that the potential structures scale with Debye lengths rather than with gyroradii. Electron beam excited electrostatic electron cyclotron waves and (ion beam driven) solitary waves are present in the plasmas adjacent to the double layers. DOE

N83-25564# Naval Research Lab., Washington, D. C.
SATURATION OF THE LOWER-HYBRID-DRIFT INSTABILITY BY MODE COUPLING
J. P. Drake, P. N. Guzdar, and J. D. Huba 26 Jan. 1983 11 p refs
(RR0330244)
(AD-A123569; NRL-MR-5009) Avail: NTIS HC A02/MF A01 CSCL 20/9

A nonlinear mode-coupling theory of the lower-hybrid-drift

instability is presented. A 2-D mode equation is derived which includes the nonlinear polarization and E X B electron drifts, adiabatic ions, and realistic sources and sinks of energy. It is found that the instability saturates by transfering energy from the growing, long wavelength modes to the damped, short wavelength modes. The saturation energy, mean square of the potential fluctuations, and diffusion coefficient are calculated self-consistently. Author (GRA)

N83-25565# California Univ., Los Angeles. Dept. of Electrical Engineering.
STUDY OF SHORT-WAVELENGTH TURBULENCE IN DENSE PLASMAS Annual Progress Report, 6 Sep. 1981 - 7 Aug. 1982
Francis F. Chen and Chan Joshi Oct. 1982 58 p refs
(Contract DE-AS08-81DP-40163)
(DE83-004488; DOE/DP-40163/1) Avail: NTIS HC A04/MF A01

A solid target facility and a Thomson scattering apparatus for the study of laser induced turbulence has been constructed and tested. Initial problems with prelase have been overcome. In an ongoing experiment on the saturation of SBS, considerable progress has been made in the form of streaked Thomson scattering data on the space and time behavior of the ion wave. DOE

N83-25566# Oak Ridge National Lab., Tenn.
LONG-WAVE ION-CYCLOTRON TURBULENCE OF PLASMA WITH TRANSVERSE FLOW
V. S. Mikhaylenko, A. I. Pyatak, and K. N. Stepanov 1982 21 p refs Transl. into ENGLISH of "Dlinnovolnovaya Ionnaya Tsiklotronnaya turbulentnost Plazmy s Poperechnym Tokom" rept. C-KhPTI-82-83 Academy of Sciences (USSR), Kharkov, 1982 17 p
(Contract W-7405-eng-26)
(DE83-002597; ORNL-TR-4917; C-KhPTI-82-83) Avail: NTIS HC A02/MF A01

In plasma with transverse flow, when the relative velocity of electrons and ions exceeds the critical value, u > u/sub cr/ greater than or equal to v/sub Ti/, along with low hybrid short wave instabilities there appear long wave (kv/sub Ti/ approx. (NU)/sub ci/) unstable oscillations having frequencies on the order of the cyclotron ion frequency, (NU)/sub ci/, which propagate almost perpendicular to the magnetic field (k/sub n//k/sub i/ approx. u/v/sub Te/ is dominated by 1). The level of oscillation density in the saturation state as obtained on the basis of the theory of weak turbulence, W approx. n/sub i/T/sub i/(T/sub e/ approx. T/sub i/), coincides in order of magnitude with the level of saturation produced by nonlinear terms in the equation of ion motion, and with the level established as a result of expanding the cyclotron resonances. Estimates of the rate of turbulence heating of electrons and ions are provided, from which estimates it follows that heating takes place during a period on the order of several cyclotron periods - that is, significantly faster than in the case of low hybrid turbulence. DOE

N83-25567# Los Alamos Scientific Lab., N. Mex.
COMPACT TOROIDAL PLASMAS: SIMULATIONS AND THEORY
D. S. Harned, D. W. Hewett, G. C. Lillequist, R. W. Moses, D. D. Schnack, J. L. Schwarzmeier, A. G. Sgro, R. L. Spencer, D. V. Anderson (California Univ., Lawrence Livermore Lab.), J. Killeen (California Univ., Lawrence Livermore Lab.) et al 1982 9 p refs Presented at the 9th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., Baltimore, Md., 1-8 Sep. 1982 Prepared in cooperation with Texas Univ., Austin, and General Atomic Co., San Diego, Calif., and Princeton Univ., N. J., and Cornell Univ., Ithaca, N.Y., and Wisconsin Univ., Madison
(Contract W-7405-eng-36)
(DE82-018107; LA-UR-82-2147; CONF-820930-4) Avail: NTIS HC A02/MF A01

Realistic FRC equilibria are calculated and their stability to the n = 1 tilting mode is studied. Excluding kinetic effects, configurations ranging from elliptical to racetrack are unstable. Particle simulations of FRCs show that particle loss on open field lines can cause sufficient plasma rotation to drive the n = 2 rotational instability. The allowed frequencies of the shear Alfven wave are calculated for use in heating of spheromaks. An expanded spheromak is introduced and its stability properties are studied. Transport calculations of CTs are described. A power balance model shows that many features of gun generated CT plasmas can be explained by the dominance of impurity radiation. It is shown how the Taylor relaxation theory, applied to gun generated CT plasmas, leads to the possibility of steady state current drive. Lastly, applications of accelerated CTs are considered. DOE

N83-25568# Los Alamos Scientific Lab., N. Mex.
US PROGRAM IN HEAVY-ION FUSION
Roger O. Bangerter 1982 17 p refs Presented at the Symp. on Accelerator Aspects of Ion Fusion, Darmstadt, West Germany, 29 Mar. 1982
(Contract W-7405-eng-36)
(DE82-015769; LA-UR-82-1192; CONF-820338-8) Avail: NTIS HC A02/MF A01

A national plan for heavy ion fusion research is outlined. The transfer of the heavy ion fusion program from the Defense Programs to the Office of Energy Research is discussed. DOE

N83-25569# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
MIRROR STABILITY OF A HOT-ELECTRON RING PLASMA
K. T. Tsang Aug. 1982 9 p refs
(Contract DE-AC03-76ET-53057)
(DE82-022155; SAI-254-82-244-LJ; PRI-50) Avail: NTIS HC A02/MF A01

The free energy associated with the anisotropy in the velocity space of a microwave heated hot electron distribution can drive the mirror mode unstable. The real frequency of this instability is of the same order as the diamagnetic drift of the hot electron. DOE

N83-25570# California Univ., Livermore. Lawrence Livermore Lab.
TMX TANDEM-MIRROR EXPERIMENTS AND THERMAL-BARRIER THEORETICAL STUDIES
T. C. Simonen, D. E. Baldwin, S. L. Allen, W. L. Barr, W. L. Hsu, G. A. Hallock, O. T. Strand, K. Audenaerde, J. F. Howard, and A. J. Lichtenberg 29 Jul. 1982 19 p refs Presented at the 9th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., Baltimore, 1-8 Sep. 1982 Prepared in cooperation with Sandia National Lab., Rensselaer Polytechnic Inst., Johns Hopkins Univ., Wisconsin Univ. and California Univ., Berkeley
(Contract W-7405-eng-48)
(DE82-020352; UCRL-87948; CONF-820930-10) Avail: NTIS HC A02/MF A01

Analysis of energy confinement in the Tandem Mirror Experiment (TMX) is discussed. TMX data indicates that warm plasma limits the amplitude of the anisotropy driven Alfven ion cyclotron (AIC) mode. Theoretical calculations show strong AIC stabilization with off normal beam injection as planned in TMX-U and MFTF-B. Results of theoretical analysis of hot electrons in thermal barriers including electron heating calculations by Monte Carlo and Fokker-Planck codes and analysis of hot electron MHD and microinstability are reported. Initial results from the TMX-U experiment are presented which show the presence of sloshing ions. DOE

N83-25571# Oak Ridge National Lab., Tenn.
ELECTRON-CONFINEMENT STUDIES ON EBT-S USING SOFT-X-RAY TECHNIQUES
D. L. Hillis, G. R. Haste, and L. A. Berry Aug. 1982 49 p
(Contract W-7405-eng-26)
(DE82-020477; ORNL/TM-8256) Avail: NTIS HC A03/MF A01

Soft X-ray bremsstrahlung measurements were performed on the ELMO Bumpy Torus (EBT-S) plasma to determine the electron temperature T/sub e/ and electron density n/sub e/ using a calibrated Si(Li) detector over a wide range of operating conditions. The necessary assumptions and essential X-ray techniques are

outlined that are inherent in soft X-ray measurements in order to investigate the electron heating and confinement properties of EBT-S. In addition, by utilizing the electron density as determined by the soft X-ray measurements, the previous EBT-S confinement analyses were extended. The steady state plasma of EBT-S is heated by microwaves using a CW gyrotron that can operate up to power levels of 200 kW. From the soft X-ray measurements, both the electron temperature and density are found to increase at higher microwave power levels. In general, confinement properties are found to improve with increased microwave power. DOE

N83-25572# California Univ., Berkeley. Lawrence Berkeley Lab. Dept. of Physics.

NATURAL POISSON STRUCTURES OF NONLINEAR PLASMA DYNAMICS

Allan N. Kaufman Jun. 1982 25 p refs Presented at the Chalmers Symp. on Plasma Theory and Expt., Aspenasgarden, Sweden, 16-18 Jun. 1982 Submitted for publication

(Contract DE-AC03-76SF-00098)

(DE82-019299; LBL-14683; CONF-820694-3) Avail: NTIS HC A02/MF A01

Hamiltonian field theories, for models for nonlinear plasma dynamics require a Poisson bracket structure for functionals of the field variables. These are presented, applied, and derived for several sets of field variables: coherent waves, incoherent waves, particle distributions, and multifluid electrodynamics. Parametric coupling of waves and plasma yields concise expressions for ponderomotive effects (in kinetic and fluid models) and for induced scattering. DOE

N83-25573# California Univ., Livermore. Lawrence Livermore Lab. National Magnetic Fusion Energy Computer Center.

MAGNETIC FUSION ENERGY AND COMPUTERS

John Killeen 1982 8 p refs Presented at the 10th Intern. Math. and Computers Simulation Congr., Montreal, 9 Aug. 1982

(Contract W-7405-eng-48)

(DE82-020165; UCRL-87454-Rev-1; CONF-820810-10-Rev-1) Avail: NTIS HC A02/MF A01

The application of computers to magnetic fusion energy research is essential. In the last several years the use of computers in the numerical modeling of fusion systems has increased substantially. There are several categories of computer models used to study the physics of magnetically confined plasmas. A comparable number of types of models for engineering studies are also in use. To meet the needs of the fusion program, the National Magnetic Fusion Energy Computer Center was established at the Lawrence Livermore National Laboratory. A large central computing facility is linked to smaller computer centers at each of the major MFE laboratories by a communication network. In addition to providing cost effective computing services, the NMFECC environment stimulates collaboration and the sharing of computer codes among the various fusion research groups. DOE

N83-25574# Wisconsin Univ., Madison. Fusion Engineering Program.

NEOCLASSICAL FLOWS AND TRANSPORT IN NONAXISYMMETRIC TOROIDAL PLASMAS

K. C. Shaing and J. D. Callen Jul. 1982 52 p refs

(Contract DE-AC02-80ER-53104)

(DE82-021691; UWFDM-474) Avail: NTIS HC A04/MF A01

The moment equation approach to neoclassical transport theory was generalized to nonaxisymmetric toroidal systems under the assumption of the existence of magnetic surfaces. In particular, the parallel plasma flows and bootstrap current are calculated in both the Pfirsch-Schlueter and banana regimes. It is found that both parallel plasma flows and the bootstrap current can be reduced as the toroidal bumpiness increases in an otherwise axisymmetric system. DOE

N83-25575# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

ROLE OF RADIATION ON THE POWER BALANCE OF THE ALCATOR C TOKAMAK Ph.D. Thesis

Mark Manly Pickrell Nov. 1982 242 p refs

(Contract DE-AC02-78ET-51013)

(DE83-005441; DOE/ET-51013/59; PFC/RR-82-30) Avail: NTIS HC A11/MF A01

The radiation from the Alcator C Tokamak plasma was measured with a 16 element, collimated, bolometer array and a single element bolometer flush with the vacuum chamber wall. In the low density regime, bar n/sub e/ less than or equal to 2 x 10 to the 14th power/cu cm, and with molybdenum limiters, radiation dominated the power balance, accounting for more than half the ohmic input, and occasionally collapsing the temperature profile into a hollow shape. The source of the radiation was molybdenum line emission. At high densities, central emission became negligible, (i.e., less than 10% of the central ohmic input). However, an enhanced emission region developed on the upper inside edge of the plasma. This region, called a marfe, radiated strongly at wavelengths corresponding to low temperature processes, such as H sub alpha and Carbon III emission. The total power lost was comparable to the rest of the plasma. DOE

N83-25576# California Univ., Berkeley. Lawrence Berkeley Lab. Accelerator and Fusion Research Div.

ALTERNATIVE DIPOLE MAGNETS FOR ISABELLE

C. Taylor, R. Althaus, S. Caspi, W. Gilbert, W. Hassenzahl, R. Meuser, J. Rechen, and R. Warren May 1982 6 p refs Presented at the 9th Intern. Cyrogenic Eng. Conf., Kobe, Japan, 10 May 1982

(Contract DE-AC03-76SF-00098)

(DE82-020549; LBL-14215; CONF-820546-9) Avail: NTIS HC A02/MF A01

A dipole magnet, intended as a possible alternative for the ISABELLE main ring magnet, was designed. Three layers of FNAL Doubler/Saver conductor were used. Two 1.3-m-long models were built and tested, both with and without an iron core, and in both helium I and helium II. The training behavior, cyclic energy loss, point of quench initiation, and quench velocity were determined. A central field of 6.5 tesla was obtained in He I (4.4 K), and 7.6 tesla in He II (1.8K). DOE

N83-25577# Massachusetts Inst. of Tech., Cambridge. Dept. of Nuclear Engineering.

HIGH-ENERGY-ION DEPLETION IN THE CHARGE EXCHANGE SPECTRUM OF ALCATOR C M.S. Thesis

David Paul Schissel 6 Aug. 1982 80 p

(DE82-021690; DOE/ET-51013/51) Avail: NTIS HC A05/MF A01

A three dimensional, guiding center, Monte Carlo code was developed to study ion orbits in Alcator C. The highly peaked ripple of the magnetic field of Alcator is represented by an analytical expression for the vector potential. The analytical ripple field is compared to the resulting magnetic field generated by a current model of the toroidal plates; agreement is excellent. Ion-ion scattering is simulated by a pitch angle and an energy scattering operator. The equations of motion are integrated with a variable time step, extrapolating integrator. The code produces collisionless banana and ripple trapped loss cones which agree well with present theory. Global energy distributions have been calculated and show a slight depletion above 8.5 keV. Particles which are ripple trapped and lost are at energies below where depletion is observed. It is found that ions pitch angle scatter less as energy is increased. DOE

N83-25578# California Univ., Livermore. Lawrence Livermore Lab.

THEORETICAL ANALYSIS OF SPECTRAL LINES OF ONE- AND TWO-ELECTRON IONS IN HOT PLASMAS

Balazs F. Rozsnyai and Theodore Einwohner 28 Jul. 1982 13 p refs Presented at the Intern. Union of Pure and Appl. Phys. Conf., Boulder, Colo., 12 Jul. 1982

(Contract W-7405-eng-48)

(DE82-020163; UCRL-87983; CONF-820732-2) Avail: NTIS HC A02/MF A01

The line shapes for the 1s-2p, 1s-3p and (ls)(2) - 1s2p, (ls)(2) - 1s3p absorption lines in hot plasmas are discussed. In model calculations the perturbing ions are considered quasi static and widths due to collisions with electrons are calculated in the impact approximation. The collective effect of the plasma electrons is accounted for by a self consistent model or by a simple Debye-Hueckel screening. These models in general predict different line shapes. Calculations for the He2, Si14 and Si13 ions are presented. DOE

N83-25579# Wisconsin Univ., Madison.
THERMAL-BARRIER TRAPPING CURRENT IN A TANDEM MIRROR Dept. of Nuclear Engineering.
R. Carrera and J. D. Callen Jun. 1982 42 p refs
(Contract DE-AC02-80ER-53104)
(DE82-021695; UWFDM-466) Avail: NTIS HC A03/MF A01

An analytic expression for the trapping current in the thermal barrier cell of a tandem mirror due to pitch-angle scattering has been obtained. The overall system is assumed to be maintained in steady state by particle injection in the central cell and charge exchange pumping is assumed in the barrier cell. Trapping of ions in the thermal barrier due to Coulomb interactions sets an irreducible minimum against which any pumping mechanism must compete. A series of boundary value problems in the various regions of phase space is obtained based on the smallness of the bounce time with respect to the collision time. A high barrier mirror ratio, long central cell and deep barrier electrostatic potential are implicit in the analysis. For conditions of interest a Lorentz collision operator describes reasonably well the kinetic problem which we have solved using a square-well approximation. Analytic results agree with numerical results within expected limits on the order of the inverse of the barrier mirror ratio. A boundary layer mechanism has been proposed which limits the trapping current value as the pumping rate is increased. DOE

N83-25580# California Univ., Livermore. Lawrence Livermore Lab.
THEORY AND SIMULATION OF LASER PLASMA COUPLING, 2
William L. Kruer 29 Jul. 1982 20 p refs Presented at the 24th Scottish Univ. Summer School in Phys., St. Andrews, Scotland, 1 Aug. 1982
(Contract W-7405-eng-48)
(DE82-020350; UCRL-87980; CONF-820848-1) Avail: NTIS HC A02/MF A01

In previous lectures at the 1979 Scottish Universities' Summer School in Physics, an introduction to the theory and simulation of laser plasma interactions was presented. A representative mix of coupling processes was discussed. In this update lecture for the 1982 school, two specific topics which have received increased attention in the last few years will be emphasized: stimulated Raman scatter and the wavelength scaling of laser plasma coupling. DOE

N83-25581# California Univ., Livermore. Lawrence Livermore Lab.
GYROKINETIC EQUILIBRIUM AND STABILITY IN QUADRUPOLE TANDEM MIRRORS
R. H. Bulmer, T. B. Kaiser, W. M. Nevins, W. A. Newcomb, L. D. Pearlstein, H. R. Strauss (New York Univ., N.Y.), S. Wollman (New York Univ., N.Y.), and M. Wakatani (Kyoto Univ., Uji, Japan) 2 Aug. 1982 15 p refs Presented at the 9th Intern. Conf. on Plasma Phys. and Controlled Nucl. Fusion Res., Baltimore, 1-8 Sep. 1982
(Contract W-7405-eng-48)
(DE82-020283; UCRL-87021; CONF-820930-8; IAEA-CN-41) Avail: NTIS HC A02/MF A01

Recent theoretical work on the equilibrium and stability of quadrupole tandem mirrors in the paraxial limit are discussed. It reviews calculations of three-dimensional equilibria by means of a beta-expansion technique which lead to an understanding of the important role played by parallel currents and the corollary importance of careful design of the structure of the vacuum geodesic curvature. The previously predicted scaling with central-cell length of the finite-beta distortion of vacuum flux surfaces is shown to saturate because of finite orbit effects. An adaptation to tandem geometries of the reduced MHD technique for calculating high-beta three-dimensional equilibria is described. This approach uses the paraxial expansion to resolve the time-dependent relaxation to equilibrium into three distinct timescales on which the motion can be followed independently. Regarding stability, it is shown that kinetic effects suppress ballooning modes of short-to-moderate perpendicular wavelength; in the limit that such effects are dominant only rigid modes are possible. DOE

N83-25582# California Univ., Livermore. Lawrence Livermore Lab.
STUDY OF IMPURITIES IN THE TANDEM MIRROR EXPERIMENT USING EXTREME-ULTRAVIOLET SPECTROSCOPY
O. T. Strand 12 May 1982 142 p refs
(Contract W-7405-eng-48)
(DE82-020610; UCRL-53295) Avail: NTIS HC A07/MF A01

Three time-resolving absolutely-calibrated normal-incidence monochromators, one on each section of TMX, were used to study the impurity emissions in the wavelength range of 300 A to 1600 A. The impurities identified in TMX were carbon, nitrogen, oxygen, and titanium. Emphasis was placed upon determining the impurity densities and radiated power losses of the central cell; results indicate that the impurity concentrations were low - less than 0.4% for each species - and that less than 10% of the total net trapped neutral beam power was lost to radiation. The use of titanium gettering on the central cell walls was observed to decrease the brightness of singly- and doubly-ionized carbon and oxygen in the central cell plasma. In the end cells, oxygen was the main impurity with a concentration of about 1.5% and was injected by the neutral beams; the other impurities had concentrations of about 0.5%. Radiation losses from the end cells were negligible. DOE

N83-25583# California Univ., Livermore. Lawrence Livermore Lab.
MATHEMATICAL MODELS AND ILLUSTRATIVE RESULTS FOR THE RINGBEARER 2 MONOPOLE/DIPOLE BEAM-PROPAGATION CODE
F. W. Chambers, J. A. Masamitsu, and E. P. Lee 24 May 1982 36 p refs
(Contract W-7405-eng-48)
(DE82-021551; UCID-19494) Avail: NTIS HC A03/MF A01

RINGBEARER II is a linearized monopole/dipole particle simulation code for studying intense relativistic electron beam propagation in gas. The mathematical models utilized for beam particle dynamics and pinch field computation are delineated. Difficulties encountered in code operations and some remedies are discussed. Sample output is presented detailing the diagnostics and the methods of display and analysis utilized. DOE

N83-25584# California Univ., Livermore. Lawrence Livermore Lab.
STUDIES OF ACCELERATED COMPACT TORUSES
C. W. Hartman, J. Eddleman (Levy (S.) Inc.), and J. H. Hammer 4 Jan. 1983 11 p refs
(Contract W-7405-eng-48)
(DE83-005488; UCID-19648) Avail: NTIS HC A02/MF A01

In an earlier publication we considered acceleration of plasma rings (Compact Torus). Several possible accelerator configurations were suggested and the possibility of focusing the accelerated rings was discussed. In this paper we consider one scheme, acceleration of a ring between coaxial electrodes by a B/sub theta/ field as in a coaxial rail-gun. If the electrodes are conical, a ring accelerated towards the apex of the cone undergoes self-similar compression (focusing) during acceleration. Because the allowable acceleration force, F/sub a/ = kappaU/sub m//R where (kappa < 1, increases as R(+2), the accelerating distance for conical electrodes is considerably shortened over that required for coaxial electrodes. In either case, however, since the accelerating flux can expand as the ring moves, most of the accelerating field energy can be converted into kinetic energy of the ring leading to high efficiency. DOE

N83-25585# Oak Ridge National Lab., Tenn. Fusion Energy Div.
STATUS OF FED/INTOR ELECTROMAGNETICS
J. G. Murray (Princeton Plasma Physics Lab.) Mar. 1983 19 p refs
(Contract W-7405-eng-26)
(DE83-005976; ORNL/TM-8420) Avail: NTIS HC A02/MF A01

This report provides a summary of the electromagnetic studies, calculations, and conclusions in the evolution of the base design of FED/INTOR (Fusion Engineering Device/International Tokamak Reactor). The electromagnetic features include the startup, control, disruptions, and design of structures. This report provides information concerning the evolution of the electromagnetic studies on FED and the justification for the eddy current design feature. The report shows that a major design feature required is the provision of a low induction and resistive path for toroidal currents to flow in the structures in order to provide self-stabilization and to manage the disruption energy dissipation. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-25586# North Carolina Agricultural and Technical State Univ., Greensboro. Dept. of Electrical Engineering.
MATERIAL GROWTH AND CHARACTERIZATION FOR SOLID STATE DEVICES Semiannual report, 1 Oct. 1982 - 31 Mar. 1983
E. K. Stefanakos, W. J. Collis, A. Abul-Fadl, and S. Iyer 1983 74 p refs
(Grant NsG-1390)
(NASA-CR-170342; NAS 1.26:170342) Avail: NTIS HC A04/MF A01 CSCL 20L

InGaAs was grown on Fe-doped (semi-insulating) (100) InP substrates by CCLPE at 640 C and current densities of 2.5 sq cm to 5 A/sq cm for periods from 5 to 30 minutes. Special efforts were made to reduce the background carrier concentration in the grown layers. The best layers exhibited carrier concentrations in the mid - 10 to the 15th power/cu cm range and up to 10,900 sq cm/V-sec room temperature mobility. InGaAsP quarternary layers of energy gap corresponding to a wavelength of approximately 1.5 micrometers were grown on (100) InP substrates by CCLPE. In all these layers, lateral edge growth was observed, possibly due to localized thermal effects at the graphite insert edges. In the device fabrication area, work was directed toward processing MISFET's using InGaAs. Silicon nitride was sputter deposited using a Si3N4 target in an ion beam deposition system. These sputtered layers were found to possess a high density of pinhole defects which precluded capacitance-voltage analysis. A deposition system for depositing Al2O3 by the pyrolytic decomposition of aluminum isopropoxide is under construction. Author

N83-25587*# National Aeronautics and Space Administration. Pasadena Office, Calif.
PHOTOELECTROCHEMICAL ELECTRODES Patent Application
Roger M. Williams (JPL, California Inst. of Tech., Pasadena) and Alan Rembaum, inventors (to NASA) (California Inst. of Tech., Pasadena) Filed 10 May 1982 29 p Sponsored by NASA
(NASA-Case-NPO-15458-1; US-Patent-Appl-SN-376306) Avail: NTIS HC A03/MF A01 CSCL 20L

The surface of a moderate band gap semiconductor such as p-type molybdenum sulfide is modified to contain an adherent film of charge mediating ionene polymer containing an electroactive unit such as bipyridinium. Electron transport between the electrode and the mediator film is favorable and photocorrosion and recombination processes are suppressed. Incorporation of particles of catalyst such as platinum within the film provides a reduction in over-voltage. The polymer film is readily deposited on the electrode surface and can be rendered stable by ionic or addition cross-linking. Catalyst can be predispersed in the polymer film or a salt can be impregnated into the film and reduced therein. NASA

N83-25588# Illinois Univ., Urbana. Coordinated Science Lab.
FORMATION OF SILICON NITRIDE STRUCTURES BY DIRECT ELECTRON-BEAM WRITING Ph.D. Thesis
Brymer Han-Yu Chin Feb. 1982 184 p refs
(Contract N00014-79-C-0424)
(AD-A124344; R-940; UILU-ENG-82-2206) Avail: NTIS HC A09/MF A01 CSCL 20/12

Localized deposits of silicon nitride, which are stable to at least 500 C, have been formed by a new technique: electron bombardment of nitrogen molecules weakly bound on a clean Si(100)-(2 X 1) surface chilled to T approximately 30 K. This process is fairly efficient; for an initial coverage of one monolayer of molecular nitrogen, we estimate the effective dissociation cross section (primary electron energy = 2000 eV) to be (0.54 - 1.2) x 10 to the 15th power sq cm. Using Auger electron spectroscopy and LEED, we have studied the growth of a silicon nitride/silicon interface rigorously free from contamination and from damage due to sputtering or ion implantation. In the Si(LVV) Auger spectrum of silicon nitride, a strong peak at 83 eV predominates; the 91-eV peak characteristic of clean Si vanishes entirely for sufficiently thick nitride films (approximately 25 - 30 A). LEED measurements, with the substrate at approximately 30 K, reveal no ordered overlayers--the pattern stays (2 X 1), but the background increases with nitridation until a fully disordered structure results. Our Auger and LEED data further indicates that the initial stage of electron-induced nitridation is the formation of a monolayer of chemisorbed nitrogen via the nucleation and lateral growth of islands. Preliminary experiments have demonstrated that local deposits of silicon dioxide may be formed by the same technique used for nitridation: electron-stimulated oxidation is more rapid with the substrates at T approximately 30 K than at room temperature. With proper outgassing of all vacuum components, particularly hot filaments, oxidation proceeds without the simultaneous growth of a surface carbon layer. GRA

N83-25589# California Univ., Los Angeles. Dept. of Physics.
PERSISTENT CURRENTS IN A ROTATING SUPERLEAK PARTIALLY FILLED WITH SUPERFLUID HELIUM Interim Report
John Stanley Marcus Dec. 1982 193 p refs
(Contract N00014-75-C-0246; NR Proj. 384-302)
(AD-A123522; TR-41) Avail: NTIS HC A09/MF A01 CSCL 20/4

Persistent currents in a partially hellium II filled rotating super-leak have been investigated. Measurements were made using the acoustic doppler shift of the thickness wave in the helium II film which covers the alumina powder grains (1 micron) of the superleak. The existence of a potential flow region (Landau region) was established and measured at low rotational speeds (below 0.5 Hz). The decay rates of persistent current velocities were measured over almost five decades of time. We found a one-to-one correspondence with our system and that of a helium II filled superleak and also to the analogous quantities in an irreversible type-II superconductor. GRA

N83-25590# Illinois Univ., Urbana. Coordinated Science Lab.
ENCAPSULATION AND IMPLANTATION STUDIES OF InP Ph.D. Thesis
John David Oberstar Jul. 1982 215 p refs
(Contract N00014-79-C-0424)
(AD-A124388; R-958; UILU-ENG-82-2224) Avail: NTIS HC A10/MF A01 CSCL 20/12

Successful ion implantation of InP will depend on detailed information regarding the protective qualities of prospective encapsulants and also the thermal annealing parameters (i.e., time and temperature) required to reorder the implant damaged lattice and to activate the implanted impurity. Using Auger electron spectroscopy (AES), secondary ion mass spectrometry (SIMS), and low temperature photoluminescence (PL) the InP encapsulation

properties of CVD SiO2, CVD PSG (phosphosilicate glass), and RF plasma-deposited Si3N4 have been examined. In addition, the annealing/implantation characteristics of semi-insulating (SI) InP implanted with 4He and 9Be have been studied using PL and SIMS. Following 60 min, 750 C anneals, indium is detected on the surfaces of Si3N4 encapsulant layers by both AES and SIMS. SIMS results also suggest that indium may outdiffuse through PSG caps during similar anneals. Indiffusion of Si from the cap to the underlying InP is found to be significant in annealed SiO2 and Si3N4 capped samples. Little such Si contamination is observed after annealing InP with PSG encapsulants. PL measurements indicate that the spectral features and luminosity levels of capped and annealed InP are least altered by PSG encapsulants. From these results it is concluded that PSG encapsulation best preserves the initial characteristics of encapsulated InP during furnace anneals. GRA

N83-25591# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Laser Hardened Materials Branch.

OPTICAL PROPERTIES RELATED TO ELECTRICAL SWITCHING OF LI DOPED NIO CRYSTALS Final Report, 15 Jun. - 15 Oct. 1981

Judith Bransky Sep. 1982 29 p refs
(AF Proj. 2422)
(AD-A124299; AFWAL-TR-82-4106) Avail: NTIS HC A03/MF A01 CSCL 20/2

The optical absorption and electrical conductivity of single crystals of NiO and Li doped NiO crystals were studied. Changes in the electrical conductivity induced by an electrical field were measured. Charge transport mechanisms in NiO were extensively investigated. The optical spectrum of some samples displaying reversible and irreversible changes in resistivity before and after switching are given. The ratio of the resistivities between the 'On' and 'Off' states ranged between X6 and X20 for various samples. Differential dynamic measurements did not show any changes in optical transmission during switching, within the experimental accuracy stated. No transmission changes were detected over the whole spectral range (500 to 1100 nm) although the resistance switched by a factor of 30. The absence of such change in transmission indicates that the relation between the absorption coefficient and the conduction mechanism of the electrical switching is different from the one for increased defect concentration. GRA

N83-25592# Lincoln Lab., Mass. Inst. of Tech., Lexington.

SOLID STATE RESEARCH Quarterly Technical Summary Report, 1 May - 31 Jul. 1982

Alan L. McWhorter 22 Nov. 1982 105 p refs
(Contract F19628-80-C-0002; AF Proj. 649L)
(AD-A124305; ESD-TR-82-086; REPT-1982-3) Avail: NTIS HC A06/MF A01 CSCL 20/12

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 May 1982 through 31 July 1982. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology. Funding is primarily provided by the Air Force, with additional support provided by the Army, DARPA, Navy, NASA, and DOE. Author (GRA)

N83-25593# Houston Univ., Tex. Dept. of Mechanical Engineering.

MEASUREMENT OF RESIDUAL STRESS USING THE TEMPERATURE DEPENDENCE OF ULTRASONIC VELOCITY Interim Report, Jun. - Dec. 1982

K. Salama, G. C. Barber, and N. Chandrasekaran Dec. 1982 10 p refs Presented at the IEEE Ultrasonic Symp., 27-29 Oct. 1982
(Contract N00014-82-K-0496)
(AD-A123694) Avail: NTIS HC A02/MF A01 CSCL 20/2

The temperature dependences of ultrasonic velocities are due to the an-harmonic nature of the crystal lattice, and therefore can be used for stress measurements. Experiments performed on 6061-T6 aluminum show that, in the vicinity of room temperature, the ultrasonic longitudinal velocity decreases linearly with temperature, and the slope of the linear relationship varies considerably when the specimen is subjected to stress. For compressive stress applied perpendicular to wave propagation, the temperature dependence of the velocity is found to decrease linearly by as much as 20% at a stress of 80 MPa. The results also indicate that the relative changes in the temperature dependence of velocity as a function of stress are equal to those previously obtained on other aluminum alloys. This shows the insensitivity of the temperature dependence method to texture and alloy composition. The method thus offers a promising possibility for the nondestructive measurement of residual stress. Author (GRA)

N83-25594# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

EFFECTS OF CONDUCTION BAND ANISOTROPY ON THE EXCITON-PLASMA MOTT TRANSITION IN INDIRECT GAP SEMICONDUCTORS M.S. Thesis

Barry Scott Davies Dec. 1982 56 p refs
(AD-A124687; AFIT/GEP/PH/82D-7) Avail: NTIS HC A04/MF A01 CSCL 20/12

A theory is developed for the incorporation of conduction band anisotropy into the analysis of the exciton-plasma Mott transition in indirect gap semiconductors. Ellipsoidal energy surfaces are assumed for the electrons while spherical energy surfaces are retained for holes. Static electron-hole screening in the random phase approximation is assumed. The Mott transition is associated with the electron-hole pair density at which the exciton binding energy in the assumed potential is zero. The binding energy is computed variationally. It is found that the electron anisotropy causes the Mott transition to shift to higher densities. It is also found that, in the absence of screening, the exciton binding energy is not significantly affected by the electron anisotropy. It is thus concluded that the shift to higher densities is due largely to the reduced ability of anisotropic electrons to screen. Author (GRA)

N83-25595# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

STUDY OF OHMIC CONTACTS ON Si(28) - IMPLANTED GaAs M.S. Thesis

Diane M. Fischer Dec. 1982 62 p refs
(AD-A124689; AFIT/GEP/PH/82D-8) Avail: NTIS HC A04/MF A01 CSCL 20/12

A study of fabricating a low resistant contact on Si(28) - implanted n-type GaAs was conducted. Ion doses of 1 x 10 to the 13th power/sq. cm to 1 x 10 to the 15th power/sq. cm and annealing temperatures of 700 C to 900 C were tested in order to achieve the lowest specific contact resistivity. Experimental results show that a low specific contact resistivity of 2.78 x 10 to the 7th power ohm/sq. cm can be obtained on GaAs layers which have been formed by Si(28) (3 x 10 to the 14th power/sq. cm) implantation in undoped semi-insulating GaAs annealed at 850 C using an oxygen-free chemical vapor deposited Si3N4 layer as an encapsulant followed by subsequent deposition of AuGe/Ni ohmic contacts. Recommendations are discussed concerning further studies and a design for a new contact test pattern which would improve the degree of accuracy of resistivity measurements. GRA

N83-25596# Rockwell International Corp., Anaheim, Calif. Defense Electronics Operations.

EPITAXIAL HEXAGONAL FERRITES FOR MILLIMETER WAVE TUNABLE FILTERS Final Report, 15 Nov. 1980 - 14 Nov. 1982

Howard L. Glass 13 Dec. 1982 17 p refs
(Contract DAAG29-80-C-0150)
(AD-A123589; C81-458.4/501; ARO-17694.1-EL-1) Avail: NTIS HC A02/MF A01 CSCL 20/2

This program has consisted of an investigation of the liquid phase epitaxial growth of hexagonal ferrites. The objective has been to obtain high quality single crystal layers of hexagonal ferrite which would be suitable for use in millimeter-wave tunable filters. The specific objectives were to determine the conditions required for preparation of ferrites which would give ferromagnetic reso-

nance at frequencies in the range of 50 to 70 GHz using magnetic bias fields available with present technology and having resonance linewidths no greater than 50 0e. The work consisted of the growth and preparation of gallate spinel substrate crystals, the liquid phase epitaxial growth of strontium hexaferrite layers on these substrates by means of a lead oxide - boron oxide flux, and the characterization of these materials. Techniques were devised for fairly reproducible growth of hexaferrites which had linewidths substantially less than 100 0e and which required fields of only about 7 K0e for resonance at 60 GHz. The best sample had a linewidth of 60 0e, a significant improvement over previous epitaxial hexaferrites. Author (GRA)

N83-25597# California Univ., Los Angeles. Dept. of Chemistry and Biochemistry.
LOW TEMPERATURE ENERGY TRAPPING AND EMISSION LINE PROFILE OF DISORDERED SOLIDS Interim Technical Report
Jack R. Morgan and M. A. El-Sayed 7 Jan. 1983 19 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A123434; TR-41) Avail: NTIS HC A02/MF A01 CSCL 20/12

In a disordered solid, where random excitation energy and donor-acceptor separation is expected, low temperature energy transfer between a high energy excited molecule to a lower energy acceptor might not be complete. As a result, the emission profile of the solid at low temperature is determined by the energy distribution of the emission of the trapping sites. Predictions based on these ideas are used and a fit is made to the 4.2K observed phosphorescent profile of 1-bromo, 4-chloronaphthalene, an orientationally disordered molecular solid. The theoretical fit to the observed emission profile is discussed in terms of the possible energy transfer mechanism(s) in this solid. Author (GRA)

N83-25598# California Univ., Los Angeles. Dept. of Chemistry.
ENERGY TRANSFER MECHANISM SWITCHING IN DISORDERED SOLIDS Interim Technical Report
Jack R. Morgan and M. A. El-Sayed 7 Jan. 1983 18 p refs Submitted for publication
(Contract N00014-75-C-0602; NR Proj. 056-498)
(AD-A123448; TR-42) Avail: NTIS HC A02/MF A01 CSCL 20/12

The excitation decay of the long wavelength portion of the inhomogeneously broadened O,O band of the transition due to triplet-triplet energy transfer in 1-bromo-4-chloronaphthalene (orientationally disordered solid) at 4.2 K is analyzed in terms of one-dimensional exchange and 3 dimensional dipole-dipole mechanisms. The fit to a dipole-dipole mechanism is observed at long decay times and very long excitation wavelength (i.e., very low acceptor concentrations). As the excitation wavelength decreases (i.e., as the acceptor concentration increases), the one-dimensional exchange mechanism, which describes only the early portion of the decay at the longest wavelength, begins to dominate in describing the full decay range. GRA

N83-25599# California Inst. of Tech., Pasadena.
CRYSTAL GROWTH IN SUBSTRATE-CONFINED LIQUIDS Technical Report, 15 Jun. - 15 Dec. 1982
J. O. McCaldin 15 Dec. 1982 14 p refs
(Contract MDA903-81-C-0354; ARPA Order 4284)
(AD-A123386) Avail: NTIS HC A02/MF A01 CSCL 20/2

The task objective is to develop crystal growth techniques utilizing substrate-confined liquids. Crystal are to be grown as arrays of single crystals of materials relevant to photodetection. The basic approach is experimental and utilizes vacuum evaporation, chemical vapor deposition, and related techniques as well as optical, SEM and X-ray instrumentation. The main result obtained is that arrays of single crystals can be grown with a basal plane oriented parallel to the substrate for the materials: In, Ge, InSb, in order of decreasing perfection. Author (GRA)

N83-25600# Aerospace Corp., El Segundo, Calif. Chemistry and Physics Lab.
CHEMICAL DEPOSITION OF TIO2 LAYERS ON GaAs
P. A. Bertrand and P. D. Fleischauer 21 Dec. 1982 24 p refs
(Contract F04701-82-C-0083)
(AD-A124281; TR-0083(3945-06)-2; SD-TR-82-92) Avail: NTIS HC A02/MF A01 CSCL 20/12

TiO2 layers have been produced on clean, etched GaAs by a chemical deposition technique in which a GaAs coupon is immersed in a nonaqueous solution of a titanium alkoxide and then removed to allow the alkoxide layer adhering to the surface to hydrolyze to TiO2. Depth profiles of the films have been measured by X-ray photoelectron spectroscopy and the scanning Auger microprobe, using both ion-beam sputter etching and chemical solution etching. The results indicate that the composition and chemical structure of the films are determined by the amount of water present in the coating solution, coating atmosphere, and hydrolysis atmosphere. Films grown in high humidity exhibit much intermixing of semiconductor and oxide components, and oxidation of the semiconductor; films grown in low humidity exhibit neither mixing nor oxidation of GaAs unless they are stored in that atmosphere for a prolonged period. GRA

N83-25601# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
CRYSTALLINE TO AMORPHOUS TRANSFORMATION IN SILICON Ph.D. Thesis
Suryanarayana Murty Chruvu Sep. 1982 101 p refs
(Contract DE-AC03-76SF-00098)
(DE83-003713; LBL-14923) Avail: NTIS HC A06/MF A01

In the present investigation, an attempt was made to understand the fundamental mechanism of crystalline to amorphous transformation in arsenic implanted silicon using high resolution electron microscopy. A comparison of the gradual disappearance of simulated lattice fringes with increasing Frenkel pair concentration with the experimental observation of sharp interfaces between crystalline and amorphous regions was carried out leading to the conclusion that when the defect concentration reaches a critical value, the crystal does relax to an amorphous state. Optical diffraction experiments using atomic models also supported this hypothesis. Both crystalline and amorphous zones were found to coexist with sharp interfaces at the atomic level. Growth of the amorphous fraction depends on the temperature, dose rate and the mass of the implanted ion. Preliminary results of high energy electron irradiation experiments at 1.2 MeV also suggested that clustering of point defects occurs near room temperature. An observation in a high resolution image of a small amorphous zone centered at the core of a dislocation is presented as evidence that the nucleation of an amorphous phase is heterogeneous in nature involving clustering or segregation of point defects near existing defects. DOE

N83-25602# Naval Research Lab., Washington, D. C.
ELECTRONIC STRUCTURE OF SUBSTOICHIOMETRIC TITANIUM-IRON HYDRIDE
D. A. Papaconstantopoulos and A. C. Switendick (Sandia National Labs., Albuquerque, N. Mex.) 1982 33 p refs Presented at the Intern. Symp. on the Properties and Appl. of Metal Hydrides, Toba, Japan, 30 May 1982
(Contract DE-AC04-76DP-00789)
(DE82-020183; SAND-82-0125C; CONF-820548-5) Avail: NTIS HC A03/MF A01

The tight-binding-coherent-potential-approximation method is applied to the study of electronic structure of TiFeH/sub x/. The starting point of these calculations is a Slater-Koster fit to the band structure of TiFe on one end, and to the band structure of TiFeH1.0 on the other. The densities of states, decomposed per site and also per angular momentum component, are obtained, as a function of hydrogen content. These densities of states are used to examine the effect of hydrogenation on both the bonding and anti-bonding levels, as well as on the position of the Fermi level. DOE

N83-25603# Sandia Labs., Albuquerque, N. Mex.
A COMPARISON OF QUARTZ CRYSTALS GROWN FROM

FUSED SILICA AND FROM CRYSTALLINE NUTRIENT
R. J. Baughman 1982 22 p refs Presented at the 36th Ann. Frequency Control Symp., Philadelphia, 4 Jun. 1982
(Contract DE-AC04-76DP-00789)
(DE82-019487; SAND-82-1486C; CONF-820698-2) Avail: NTIS HC A02/MF A01

Synthetic quartz crystals are traditionally grown from a crystalline nutrient. Most of the present crystal growth is from natural quartz nutrient imported from Brazil. This material is handpicked for quality but does not have limited purity levels. The raw material may or may not contain levels of impurities that are detrimental to the intended purpose of the grown crystal. Impurity concentration and species of natural lascus are not uniform or consistent even when produced from the same source of supply. A comparison of crystals grown in 1978 from a fused silica nutrient and crystalline nutrient in a new autoclave to those recently grown in the same aged autoclave was made. Several crystal characteristics are discussed. DOE

N83-25604# Brookhaven National Lab., Upton, N. Y.
STUDY OF III-V SEMICONDUCTOR BAND STRUCTURE BY SYNCHROTRON PHOTOEMISSION
G. P. Williams, F. Cerrina, J. Anderson, G. J. Lapeyre, R. J. Smith, J. Hermanson, and J. A. Knapp 1982 3 p refs Presented at the 16th Intern. Conf. on the Phys. of Semiconductors, Montpellier, France, 6-10 Sep. 1982 Prepared in cooperation with Wisconsin Univ., Stoughton, Sandia Labs., Albuquerque, N. Mex. and Montana State Univ., Bozeman
(Contract DE-AC02-76CH-00016)
(DE82-016331; BNL-31574; CONF-820937-1) Avail: NTIS HC A02/MF A01

Angle-resolved synchrotron photoemission studies of six III-V semiconductors were carried out. For emission normal to the (110) plane of these materials, peaks in the experimental spectra were identified with the bands involved in the transitions, and the critical point energies X3, X5, and sigma 1 (min), were determined. The data indicate that k perpendicular is conserved in the transitions. Comparison of the data with theoretical bands permits an evaluation of k perpendicular associated with the experimentally observed transition, and from this information the bands were plotted out. DOE

N83-25605# Riso National Lab., Roskilde (Denmark).
SYNCHROTRON X-RAY STUDY OF PHYSISORBED FILMS OF MIXTURES OF Ar AND Xe ON GRAPHITE
J. Bohr, M. Nielsen (Brookhaven National Lab., Upton, N.Y.), J. P. McTague, J. Als-Nielsen, and K. Kjaer Jul. 1982 12 p refs Presented at the 2nd Intern. Symp. on Statist. Mech. of Adsorption, Trieste, Italy, 1 Jul. 1982
(Contract DE-AC02-76CH-00016)
(DE82-019349; BNL-31578; CONF-820744-1) Avail: NTIS HC A02/MF A01

Mixtures of Ar and Xe were studied in most of the submonolayer region of the phase diagram (T,chi,rho) T = temperature, chi = chemical composition, rho = fraction of a monolayer. The basic feature is a large tendency to form square root of 3 square root of 3 commensurate alloys (Kr-like structures), but none of the commensurate nor of the incommensurate structures form a chemially ordered alloy at 11 K. Thus the 2D solid can be thought of as a solid consisting of particles of an average size. This allows the study of commensurate-incommensurate phase transition driven by average particle size. The transition is indeed a sharp first order transition taking place through coexisting phases. Another interesting feature is the existence of well correlated liquid-like structures which preserve their correlation over a temperature range of 5 Kelvin or more. This unusual behavior is for chemical compositions where there is coexistence of commensurate and an incommensurate solid at high temperature. DOE

N83-25606# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
STRUCTURE OF SURFACES OF INTERFACES
Ronald Gronsky Jun. 1982 18 p refs Presented at the 10th Intern. Congr. on Electron Microscopy, Hamburg, 17 Aug. 1982
(Contract DE-AC03-76SF-00098)
(DE82-019302; LBL-14528; CONF-820846-1) Avail: NTIS HC A02/MF A01

Only relatively recently has electron microscopy demonstrated its potential for the complete (atomic level) determination of surface and interfacial structure. For years, surfaces were studied exclusively with scanning systems and interfaces with transmission systems and were constantly and drastically modified by the hostile vacuum environments of electron-optical columns; this is no longer true. Local deviations in bulk crystalline order which represent defects were also frequently beyond the resolution limits set by probe size or lens aberrations, but this is thankfully no longer a limitation. Applications of electron microscopy brought the study of surface and interfacial structure much closer to the atomic level. Some recent developments are identified, their application to the microstructural analysis of surfaces and interfaces is summarized and where they contributed to the science of materials is indicated. DOE

N83-25607# Illinois Univ., Urbana-Champaign. Dept. of Physics.
X-RAY-DIFFRACTION STUDY OF VACANCIES IN bcc HELIUM-3 AND bcc HELIUM-4 Ph.D. Thesis
Paul Richard Granfors 1982 182 p refs Sponsored in part by the General Electric Co. and Exxon USA Foundation
(Contract DE-AC02-76ER-01198)
(DE82-020141; DOE/ER-01198/1387) Avail: NTIS HC A09/MF A01

Absolute lattice parameters in bcc 4He crystals in contact with superfluid 4He were measured in the temperature range 1.494 to 1.711 K, corresponding to molar volumes between 20.88 and 21.09 cu cm/mole. Vacancy concentrations at melting were estimated from a comparison of these lattice parameters with bulk volumes from the literature. The value of the free energy of formation for vacancies in bcc 4He obtained from these measurements is f/sub v/ = 9+-1 K. Relation between this value and indirect inferences about vacancy formation from ion mobility and NMR is discussed. Comparisons are made between the formation free energy in bcc 4He and the same quantity at the same molar volume in the extensively studied bcc phase of 3He. A systematic study of the temperature dependence of the lattice parameter in crystals of bcc 3He with molar volumes betwen 23.35 and 24.80 cu cm/mole was made. Present measurements with an improved X-ray technique confirm previous X-ray measurements when simple exponentials are fitted to the data. DOE

N83-25608# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
STRUCTURE OF LARGE-ANGLE GRAIN BOUNDARIES IN METALS AND CERAMIC OXIDES
R. W. Balluffi, P. D. Bristowe, and A. Brokman Aug. 1982 45 p refs
(Contract DE-AC02-78ER-05002)
(DE82-022006; DOE/ER-05002/28) Avail: NTIS HC A03/MF A01

Recent progress in the understanding of grain boundary structure in metals and ceramic oxides is critically reviewed with emphasis on both experimental and theoretical work. The review essentially updates an earlier review presented at the 1979 Fall Meeting: i.e., R. W. Balluffi, P. D. Bristowe and C. P. Sun, J. Amer. Ceram. Soc. 64,25(1981). DOE

N83-25609# Brown Univ., Providence, R. I. Div. of Engineering.
EFFECTS OF TRIAXIAL STRESSING ON CREEP CAVITATION OF GRAIN BOUNDARIES
T-L. Sham (Rensselaer Polytechnic Inst., Troy, N.Y.) and A. Needleman Sep. 1982 31 p refs
(Contract DE-AC02-80ER-10556)
(DE83-004083; DOE/ER-10556/92) Avail: NTIS HC A03/MF A01

We investigate the influence of triaxial stressing on the growth of cavities on grain boundaries by the combined processes of

plastic creep flow and grain boundary diffusion. The coupling arises from local accomodation of matter on the grain boundary near the cavity tip due to plastic creep deformability of the grains. This has the effect of shortening the diffusion path length on the grain boundary and increasing the cavity volumetric growth rate. An increase in triaxiality is found to accelerate the matter flux flowing from the cavity surfaces onto the grain boundaries and thus increase the cavity volumetric growth rate. This occurs at realizable levels of triaxiality. However, the enhancement in the triaxial stress state does not affect the effective diffusion path length very significantly. A simple formula for the volumetric growth rate of the cavity is suggested and it is found to give a good approximation to the numerically computed results. DOE

N83-25610# State Univ. of New York, Stony Brook. Dept. of Materials Science and Engineering.
CHARACTERIZATION OF IMPERFECTIONS IN PLASMA-SPRAYED TITANIA
C. C. Berndt, R. Kolipari, R. A. Zatorski, H. Herman, A. Jonca (Rensselaer Polytechnic Inst., Troy, N.Y.), T. Templeton (Rensselaer Polytechnic Inst., Troy, N.Y.), and R. K. MacCrone (Rensselaer Polytechnic Inst., Troy, N.Y.) 1982 8 p refs
(Contract DE-AC02-79ER-10438; Grant NSF DMR-80-11439)
(DE83-004813; DOE/ER-10428/2) Avail: NTIS HC A02/MF A01

Magnetic measurements have been shown in this investigation to be a powerful method of obtaining new information about plasma-sprayed oxides (TiO2). It has shown that significant interaction in the form of substrate melting occurs on the impingement of the molten particles, lending support to the ideas of Dallaire. Although the temperature dependence suggests metallic inclusions, the deduced magnetization is not in agreement with the magnitude appropriate for iron. Indeed, the magnetization is less than the likely ferritic phases. The estimated thickness of the magnetic phase is very reasonable. As expected, the predominant ionic defect detected was the Ti(3) ion, in concentrations very similar to titania, reduced under moderate conditions. In principle, the Ti(3) ion concentration can be determined quantitatively and related to the spraying parameters. DOE

N83-25611# Harvard Univ., Cambridge, Mass. Div. of Applied Sciences.
DRIFT MOBILITIES BY TIME-OF-FLIGHT METHODS AND TIME-DEPENDENT PHOTOTRANSPORT IN THE NANOSECOND REGIME IN AMORPHOUS SEMICONDUCTORS
P. B. Kirby and W. Paul Dec. 1982 21 p refs
(Contract DE-AC02-82ER-12064)
(DE83-004523; DOE/ER-12064/1) Avail: NTIS HC A02/MF A01

Transport and recombination were studied in samples of hydrogenated amorphous silicon through measurements of photocurrent transients in the nanosecond to millisecond time regimes. Both sample configurations suitable for time of flight measurements and configurations appropriate for the usual photoconductivity measurements were employed. In principle, analysis of the experiments together permits the separation of current decreases with time caused by time dependent mobilities from those caused by carrier loss due to deep trapping. The former involves carrier trapping which is temporary on the time scale of the experiment; the latter, trapping which removes carriers permanently, on the same time scale. The occurrence of the latter carrier loss is checked through integration of the current transient to obtain the total collected charge, with the applied electric field as a parameter. DOE

N83-25612# Case Western Reserve Univ., Cleveland, Ohio. Dept. of Metallurgy and Materials Science.
EXPERIMENTS IN HIGH-VOLTAGE ELECTRON MICROSCOPY Final Report for period ending 30 Nov. 1982
T. E. Mitchell 1983 12 p refs
(Contract DE-AC02-76ER-02119)
(DE83-005283; DOE/ER-02119/25; COO-2119-25) Avail: NTIS HC A02/MF A01

High voltage electron microscopy, in the area of radiation damage, particularly in metallic alloys and ceramic compounds is discussed. For the case of substitutional alloys it has been shown that enhanced precipitation can occur for supersatured solutions, while undersaturated solid solution alloys can also be destabilized by irradiation, leading to either homogeneous or heterogeneous precipitation; heterogeneous sites include foil surfaces. Ordered compounds were also studied extensively and it was shown that the point defects generated can lead to disordering at low temperatures or secondary defect formation (dislocation loops) at higher temperatures. The behavior of ceramics divides sharply into those like quartz which undergo ionization damage leading to amorphization and those like MgO and Al2O3 which undergo normal knock-on damage leading to secondary defect formation (loops and voids). Microstructures of a wide range of ceramics (e.g., YAG, Si3N4, MgAl2O4) were studied and related to their crystal structures. Other important discoveries were the influence of grain boundaries where the microstructural development is different and leads to enhanced degradation. DOE

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

N83-25613# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
VECTORAL FIELDS, LINEAR SPACES, AND TENSORS IN PHYSICS. PART 2: LINEAR OPERATORS, MATRICES, AND AUTOVALUES [CAMPOS VETORIAIS, ESPACOS LINEARES E TENSORS NA FISICA. PARTE 2: OPERADORES LINEARES, MATRIZES E AUTOVALORES]
Rene A. Medrano-B Nov. 1982 235 p refs In PORTUGUESE; ENGLISH summary 3 Vol.
(INPE-2565-MD/020-Pt-2) Avail: NTIS HC A11/MF A01

In a concise manner, although with all necessary mathematical justification, in seven chapters is presented the study of multidimensional linear vector spaces. The transformation of vectors by linear operators (here restricted to matrices) and the effect of change of basis on them is analyzed. The Dirac's notation to denote vectors in Quantum Mechanics is here used in order to preserve the universal meaning of vectors. Special attention is paid to eigenvalue problems and their applications. The last chapter consists of an introduction to the Hilbert space. At the end of each chapter a number of problems intended to help elucidate and broaden the knowledge of the reader is included. Author

N83-24982# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMODYNAMICS OF HIGH-TEMPERATURE BRINES
K. S. Pitzer, P. S. Z. Rogers, and J. C. Peiper *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 152-154 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

N83-24984# California Univ., Berkeley. Lawrence Berkeley Lab.
THERMODYNAMIC PROPERTIES OF SILICATE MATERIALS
I. S. E. Carmichael, L. K. Moret, M. L. Rivers, J. F. Stebbins, and X. Mo *In* Lawrence Berkeley Lab. Nucl. Waste Isolation, Geophys. and Reservoir Eng., Geosci. Sep. 1982 p 157-159 refs (For primary document see N83-24933 14-42)
Avail: NTIS HC A09/MF A01

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

No abstracts in this category.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-25614# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
AN INTERACTIVE SYSTEM FOR PROJECT CONTROL AND PLANNING M.S. Thesis - Apr. 1982 [UM SISTEMA INTERATIVO PARA CONTROLE E PLANEJAMENTO DE PROJETOS]
Acacio Feliciano Neto Jan. 1983 138 p refs In PORTUGUESE; ENGLISH summary
(INPE-2620-TDL/107) Avail: NTIS HC A07/MF A01

The design, development and test of an interactive interface, conceived to simplify the computer used in creating, updating, and consulting a network data base, are described. Author

N83-25615# Defense Systems Management School, Fort Belvoir, Va. Dept. of Policy and Organizational Management.
MULTI-DIMENSIONAL PROGRAM MANAGEMENT Progress Report, 26 Jul. - 10 Dec. 1982
Philip E. Hamilton Dec. 1982 84 p refs
(AD-A123635) Avail: NTIS HC A05/MF A01 CSCL 05/1

This is a student research project with the following objectives: (1) To model a generic program management office and the system of which it is an element. This model systematically illustrates the integration and necessary interface of the human, organizational, and technical aspects of program management; (2) To use the model as a baseline to identify or develop skills and methodologies the PM might use to manage this integration; and (3) To identify resources as they apply to the skills and methodologies that have been identified. Author (GRA)

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software.*

N83-25616# Los Alamos Scientific Lab., N. Mex.
HISTORICAL PERSPECTIVE OF MASS STORAGE
Jack Worlton 1982 5 p refs Presented at the 5th IEEE Symp. on Mass Storage System, Denver, 15 Oct. 1982
(Contract W-7405-eng-36)
(DE82-018376; LA-UR-82-1708; CONF-821014-1) Avail: NTIS HC A02/MF A01

The need to store information is older than civilization itself. Primitive peoples recorded information about their lives, activities, and environment as early as the Paleolithic Era, and some of these records are still extant. Beginning with these records, some of the symbolisms, media, and tools used for recording information through the major ages of technology are reviewed, with emphasis on the very early history of the recording of information. DOE

N83-25617# Maryland Univ., College Park. Computer Vision Lab.
APPLICATION OF HIERARCHICAL DATA STRUCTURES TO GEOGRAPHICAL INFORMATION SYSTEMS Final Report
Hanan Samet, Azriel Rosenfeld, Cliff Shaffer, and Robert Webber Jul. 1982 171 p refs
(Contract DAAK70-81-C-0059)
(AD-A124196; ETL-0301; TR-1197) Avail: NTIS HC A08/MF A01 CSCL 09/2

This project is concerned with the applicability of a class of hierarchical data structures, known as 'quadtrees', to the representation of cartographic data. Section 2 presents a tutorial on quadtree data structures. Section 3 describes the database used, and the process of digitizing and editing it. Section 4 describes the process of quadtree encoding of the data, including algorithms and space/time/acreage tables. Section 5 discusses region analysis and manipulations using quadtrees, including algoritms and tables (time, etc.). The algorithms implemented include set theoretic operations on regions, point-in-region determination, region property measurement, and construction of submaps and merged maps. Section 6 presents a bibliography on quadtrees. Author (GRA)

N83-25618# Oak Ridge National Lab., Tenn.
REDUCING THE SIZE OF A DATA BASE BY USING PATTERN-RECOGNITION TECHNIQUES
N. E. Clapp, Jr. 1982 10 p refs Presented at the ASIS 1982 Mid-Year Meeting, Knoxville, Tenn., 13-16 Jun. 1982
(Contract W-7405-eng-26)
(DE82-017388; CONF-820624-4) Avail: NTIS HC A02/MF A01

An on line surveillance system at a nuclear power plant samples data and calculates the power spectral density. A method of reducing the amount of stored data by screening the data using a pattern recognition technique was developed. The system stores only the spectra that differ from normal, pius the corresponding plant operating conditions. DOE

N83-25619# California Univ., Livermore. Lawrence Livermore Lab. National Magnetic Fusion Energy Computer Center.
SLATEC COMMON MATHEMATICAL LIBRARY SOURCE FILE FORMAT
Kirby W. Fong, Thomas H. Jefferson (Sandia National Lab.), and Tokihiko Suyehiro Jul. 1982 15 p
(Contract W-7405-eng-48)
(DE83-005812; UCRL-53313) Avail: NTIS HC A02/MF A01

The source file for the SLATEC Common Mathematical Library is described. Information needed to further process or transform the file is provided for anyone writing a program. To a lesser extent, this document serves as a guide for programmers preparing additional codes for inclusion in the source file. DOE

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

N83-25620# Pacific Northwest Lab., Richland, Wash.
A DECISION MAKING MODEL FOR THE RECOVERY OF USEFUL MATERIAL RESOURCES FROM WASTES
K. H. Rising, G. A. Jensen, and V. F. FitzPatrick Jun. 1982 14 p Presented at the 1982 Intern. Conf. of the Intern. Assoc. of Energy Econ., London, 28-30 Jun. 1982
(Contract DE-AC06-76RL-01830)
(DE82-019204; PNL-SA-10310; CONF-8206103-1) Avail: NTIS HC A02/MF A01

The recovery of valuable materials and the recycling of useful products from wastes generated in energy production and industrial processing are considered. The technical feasibility for recovery and recycle, including decontamination of nuclear-related materials, were proven and demonstrated. The economic feasibility depends on both the resale and strategic values of the material, the saving from reusing rather than disposing of the material, the reclamation cost, and other factors that may influence the incentive for recovery and recycle. A model to identify the economic and other incentives for the reclamation of useful material resources was developed. Using available data to quantify factors such as strategic and resale values, reclamation cost and disposal cost saving, this model calculates the incentive value consisting of the above factors and

selects the appropriate reclamation option. Because this model is empirical, there are limitations to its application. However, within the boundary where the model was tested, it can be a useful tool for the decision maker to evaluate the economic feasibility of reclamation. DOE

N83-25621# Little (Arthur D.), Inc., Cambridge, Mass.
DEVELOPMENT, APPLICATION, AND EVALUATION OF A VALUE-IMPACT METHODOLOGY FOR PRIORITIZATION OF REACTOR-SAFETY R AND D PROJECTS Final Report
J. Fiksel, A. L. Cox, and D. L. Richardson Aug. 1982 158 p refs Sponsored by EPRI
(EPRI Proj. 1810-2)
(DE82-906466; EPRI-NP-2530) Avail: NTIS HC A09/MF A01

A practical methodology was developed for describing alternative R and D projects, for eliminating inferior projects, for evaluating the remaining projects, and for ranking them for selection purposes. This approach was demonstrated by applying it to four sample projects dealing with improvements in residual heat removal systems. It was found that the conventional value impact analysis approach is inadequate for the purposes of R and D project selection. A number of modifications are suggested to permit more explicit treatment of the risk and uncertainty inherent in R and D projects and to clarify the basis for choice among them. DOE

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-25622# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
Washington GPO 1983 14 p An act, H.R. 2065, referred to the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 27 Apr. 1983
Avail: US Capitol, Senate Document Room

Appropriations for research and development, construction of facilities, and research and program management, and for other purposes were authorized. The amounts of authorizations are presented. S.L.

N83-25623# Committee on Commerce, Science, and Transportation (U. S. Senate).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION ACT, 1983
1983 13 p Bill S. 1096 referred to the Comm. on Com., Sci. and Transportation, 98th Congr., 1st Sess., 19 Apr. 1983
Avail: US Capitol, Senate Document Room

A bill to authorize appropriations for research and development, construction of facilities, and research and program management is presented. Author

N83-25624# General Accounting Office, Washington, D. C. Resources, Community and Economic Development Div.
ANALYSIS OF THE COMPREHENSIVE ENERGY EMERGENCY RESPONSE PROCEDURES REPORT
17 Feb. 1982 39 p refs
(GAO/RCED-83-106; B-210236) Avail: NTIS HC A03/MF A01

The objectives, scope, and methodology used to assess the administration's procedures for responding to energy emergencies in the light of requirements of the Energy Emergency Preparedness Act of 1982 are described. The GAO determined that the comprehensive procedures report lacks the desired specificity in describing options to be considered and the methods for implementing them. In addition, key parts of the administration's programs are still not ready. A.R.H.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-25625*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FREE-PISTON STIRLING HYDRAULIC ENGINE AND DRIVE SYSTEM FOR AUTOMOBILES
Donald G. Beremand, Jack G. Slaby, Ralph C. Nussle, and David Miao Nov. 1982 28 p refs Presented at Automotive Technol. Develop. Contractor Coordination Meeting, Dearborn, Mich., 25-28 Oct. 1982
(NASA-TM-82992; E-1421-3; NAS 1.15:82992) Avail: NTIS HC A03/MF A01 CSCL 13F

The calculated fuel economy for an automotive free piston Stirling hydraulic engine and drive system using a pneumatic accumulator with the fuel economy of both a conventional 1980 spark ignition engine in an X body class vehicle and the estimated fuel economy of a 1984 spark ignition vehicle system are compared. The results show that the free piston Stirling hydraulic system with a two speed transmission has a combined fuel economy nearly twice that of the 1980 spark ignition engine - 21.5 versus 10.9 km/liter (50.7 versus 25.6 mpg) under comparable conditions. The fuel economy improvement over the 1984 spark ignition engine was 81 percent. The fuel economy sensitivity of the Stirling hydraulic system to system weight, number of transmission shifts, accumulator pressure ratio and maximum pressure, auxiliary power requirements, braking energy recovery, and varying vehicle performance requirements are considered. An important finding is that a multispeed transmission is not required. The penalty for a single speed versus a two speed transmission is about a 12 percent drop in combined fuel economy to 19.0 km/liter (44.7 mpg). This is still a 60 percent improvement in combined fuel economy over the projected 1984 spark ignition vehicle. S.L.

N83-25626# Sandia Labs., Albuquerque, N. Mex.
THE INFORMATION DATA BASES AT THE TRANSPORTATION TECHNOLOGY CENTER
E. L. Emerson 1982 16 p
(Contract DE-AC04-76DP-00789)
(DE82-011468; SAND-81-2549C) Avail: NTIS HC A02/MF A01

A description is presented of the Transportation Technology Center (TTC). The center provides technical management and support for those programs related to the transportation of nuclear materials. A very important support function is the ability to provide information upon request. A special collections library was established in the TTC and work was started on several of the information data bases. The TTC has six information collection in computerized data bases. Persons to contact for information concerning each of the following data bases are listed. The data bases are: nuclear material transportation incidents, radioactive materials packaging, legislative and regulatory information system, research in progress, bibliographic collection, and transportation technical environmental information. DOE

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-25627 Academy of Sciences (USSR), Moscow. Space Research Inst.
COMPTONIZATION IN RADIATION-DOMINATED SHOCKS AND SPECTRA OF X-RAY PULSARS
Yu. E. Lyubarsky and R. A. Sunyaev [1982] 27 p refs Submitted for publication
(Rept-723) Copyright. Avail: Issuing Activity

Bulk of accretion energy under high accretion rate is released in radiation dominated shock. Radiation stops plasma flow and takes the energy away. Multiple scatterings of photons on electrons in the braking flow form a characteristic spectrum of radiation and lead to the heating of electrons. This mechanism results in the formation of hard tail in X-ray pulsars spectra. Small spectral indices O < and varies as O < 1 and the exponential cutoff for beta upsilon approximately 100 keV are charactrized for these spectra. S.L.

N83-25628*# California Inst. of Tech., Pasadena.
PROPERTIES OF YOUNG CLUSTERS NEAR REFLECTION NEBULAE
K. Sellgren [1983] 42 p refs
(NASA-CR-170305; NAS 1.26:170305) Avail: NTIS HC A03/MF A01 CSCL 03A

Near infrared observations in the reflection nebulae NGC 7023, 2023, and 2068 are used to study clusters of young stars found associated with these nebulae. At least 30% to 60% of these stars are pre-main sequence objects, as indicated by their infrared excesses, hydrogen line emission, or irregular variability. The spatial distributions and observed luminosity functions of these young open clusters are derived, and the inferred mass function and star formation efficiencies are discussed. Author

N83-25629*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
EXTENDED NEAR INFRARED EMISSION FROM VISUAL REFLECTION NEBULAE
K. Sellgren (California Inst. of Tech., Pasadena), M. W. Werner, and Harriet L. Dinerstein (Texas Univ., Austin) [1982] 14 p refs
(NASA-TM-85315; NAS 1.15:85315) Avail: NTIS HC A02/MF A01 CSCL 03A

Extended near infrared (2 to 5 microns) emission was observed from three visual reflection nebulae, NGC 7023, 2023, and 2068. The emission from each nebula consists of a smooth continuum, which can be described by a greybody with a color temperature of 1000 K, and emission features at 3.3 and 3.4 microns. The continuum emission cannot be explained by free-free emission, reflected light, or field stars, or by thermal emission from grains, with commonly accepted ratios of infrared to ultraviolet emissivities, which are in equilibrium with the stellar radiation field. A possible explanation is thermal emission from grains with extremely low ratios of infrared to ultraviolet emissivities, or from grains with a temperature determined by mechanisms other than equilibrium radiative heating. Another possibility is continuum fluorescence. S.L.

N83-25630*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
FIRST DETECTION OF THE GROUND STATE JK = 1 SUB 0 GOING TO 0 SUB 0 SUBMILLIMETER TRANSITION OF INTERSTELLAR AMMONIA
Jocelyn Keene (California Inst. of Tech.), Geoffrey A. Blake, and T. G. Phillips May 1983 18 p refs Submitted for publication
(NASA-TM-84359; A-9321; NAS 1.15:84359; Preprint-Ser-010) Avail: NTIS HC A03/MF A01 CSCL 03A

The JK = 1 sub 0 approaching O sub 0 transition of ammonia at 572.5 GHz was detected in OMC-1 from NASA's Kuiper Airborne Observatory. The central velocity of the line (VLSR approximately = 9 km/s) indicates that it originates in the molecular cloud material, not the hot core. The derived filling factor of approximately > 0.09 in a 2' beam implies a source diameter of approximately > 35' if it is a single clump. This clump area is much larger than that derived from observations of the sub 1 inversion transition. The larger optical depth in the 1 sub 0 approaching 0 sub 0 transition (75-350) can account for the increased source area and linewidth as compared with those seen in the 1 sub 0 inversion transition. Author

N83-25631*# Hawaii Univ., Honolulu. Inst. for Astronomy.
RESEARCH IN PLANETARY ASTRONOMY AND OPERATION OF MAUNA KEA OBSERVATORY Semiannual Progress Report, Jan. - Dec. 1981
John T. Jefferies [1982] 56 p refs
(Grant NGL-12-001-057)
(NASA-CR-170246; NAS 1.26:170246; SAPR-22/23) Avail: NTIS HC A04/MF A01 CSCL 03A

Highlights of the programs including the major planets, satellites, asteroids, and comets are presented. The operation of the 2.24 m telescope is discussed. S.L.

N83-25632# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
DIAMETERS OF O TYPE STARS BASED ON ULTRAVIOLET OBSERVATIONS
K. Ramanuja Rao and C. M. Espirito Santo Apr. 1983 22 p refs Submitted for Publication Sponsored by FINEP
(INPE-2692-PRE/290) Avail: NTIS HC A02/MF A01

Using the ultraviolet flux obtained by the TD-1 satellite and assuming the Planck radiation law, the diameters of 0 type stars were calculated. These values are shown to be in good agreement with the earlier values obtained by direct techniques and indirect methods. Using this method diameters are also calculated for some 0 stars for which no previous data are available. Author

N83-25633# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
ULTRAVIOLET LINES FROM EMISSION LINE GIANTS
Kalvala RamanujiRao Mar. 1983 15 p refs Submitted for publication Sponsored in part by FINEP
(INPE-2690-PRE/289) Avail: NTIS HC A02/MF A01

Many supergiants show absorption features in the ultraviolet region. Indices based on the flux in a narrow band of about 40 A and a broad band of about 80 A centered on these absorption features are defined and their relation with the intrinsic color is studied. It is also shown that the likely ion which affects the absorption features at 1400 A and 1550 A in emission line giants is Si II. Author

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-25634*# California Inst. of Tech., Pasadena. Space Radiation Lab.
RESEARCH IN PARTICLES AND FIELDS Semiannual Status Report
R. E. Vogt, A. Buffington, L. Davis, Jr., and E. C. Stone [1982] 28 p refs
(Grant NGR-05-002-160)
(NASA-CR-170335; NAS 1.26:170335) Avail: NTIS HC A03/MF A01 CSCL 03B

Cosmic rays and astrophysical plasmas, NASA spacecraft experiment activities, and gamma rays are discussed. Author

N83-25635# Edgerton, Germeshausen and Grier, Inc., Los Alamos, N. Mex.
EVOLUTIONARY MODELS FOR SNI PROGENITOR STARS
Jeffrey D. Colvin 1982 6 p refs Presented at the 19th Intern. Symp. on Combust., Haifa, Israel, 8 Aug. 1982
(Contract DE-AC08-76NV-01183)

(DE82-019939; EGG-1183-1836; CONF-820801-13) Avail: NTIS HC A02/MF A01

Calculations which are based on a variant of the Henyey method, and include the effects of mass accretion convective mixing, nuclear burning, and gravitational settling are discussed. This is the first WD evolutionary calculation that includes all the physical effects thought to be responsible for the composition morphology, while making use of the best available equation of state for WD matter. Preliminary results consisting of two evolutionary sequences resulting from spherically symmetric accretion of normal matter (X = 0.700, Y = 0.285) onto an intially pure C-12 WD of mass 1.00 M and initial luminosity given by log L/L = 3.74 are presented. DOE

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N83-25636* Geological Survey, Flagstaff, Ariz.
A CATALOG OF SELECTED VIKING ORBITER IMAGES
Richard L. Turner and Roger D. Carroll Feb. 1983 402 p refs
(NASA-RP-1093; NAS 1.61:1093) Avail: NTIS HC A17 CSCL 03B

This collection of Viking Orbiter photomosaics is designed to facilitate identification and location of the various pictures with respect to the surface of Mars. Only a representative set of the nearly 50,000 images taken by the two Viking Orbiters, and computer-processed prior to December 1978, are contained in the mosaics and in the picture listings. Author

N83-25637*# Chicago Univ., Ill. Dept. of the Geophysical Sciences.
MINERALOGY AND CHEMISTRY OF PLANETS AND METEORITES Final Technical Report
25 May 1983 11 p refs
(Grant NGR-14-001-171)
(NASA-CR-170345; NAS 1.26:170345) Avail: NTIS HC A02/MF A01 CSCL 03B

The data collection and the interpretation with respect to the mineralogy of meteoritic and terrestrial samples are summarized. The key conclusion is that the Moon underwent a series of melting episodes with complex crystal-liquid differentiation. It was not possible to determine whether the Moon melted completely or only partially. The stage is now set for a systematical geochemical and geophysical survey of the Moon. Emphasis was moved to meteorites in order to sort out their interrelationships from the viewpoint of mineral chemistry. Several parent bodies are needed for the achondrites with different chemical properties. Exploration of Mars is required to test ideas based on the possible assignment of shergottites, nakhlites and chassignite to this planet. Early rocks on the Earth have properties consistent with a heavy bombardment and strong volcanic activity prior to 4 billion years ago. S.L.

N83-25638*# Lunar and Planetary Inst., Houston, Tex.
USE OF BASALTIC MAGMAS TO CHARACTERIZE PROCESSES IN PLANETARY INTERIORS: A TEST CASE IN THE SOUTHWESTERN UNITED STATES Monthly Progress Report, May 1982
James Wittke (Texas Univ., Austin) 6 Aug. 1982 12 p ref
(Contract NASw-3389)
(NASA-CR-170311; NAS 1.26:170311) Avail: NTIS HC A02/MF A01 CSCL 03B

Whether or not basaltic rocks can be used as mantle probes depends upon the degree to which their compositions reflect their source regions rather than their subsequent histories. Mantle heterogeneities in the central Arizona Transition Zone were studied, and the degree to which interaction with the crust has modified the lavas masking these original variations was examined. Basalts from a thick sequence of basaltic flows in the Hickey Formation and two younger flows were sampled in order to provide a time transgressive suite of rocks. These rocks were dated and an extensive set of analytical data is now available for them. Author

N83-25639*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FINE-SCALE STRUCTURE OF THE JOVIAN MAGNETOTAIL CURRENT SHEET
Kenneth W. Behannon Feb. 1983 32 p refs Submitted for publication
(NASA-TM-85014; NAS 1.15:85014) Avail: NTIS HC A03/MF A01 CSCL 03B

During the outbound leg of its passage through the Jovian magnetosphere in the Voyager 2 spacecraft observed > 50 traversals of the magnetotail current sheet during a 10 day period at distances between 30 and 130 R sub j. Analysis of these observations shown that the Jovian tail sheet tends to lie approximately parallel to the ecliptic plane and to oscillate about the tail axis with the 10 hour planetary rotation period. The magnetic structure near and within the current sheet was variable with time and distance from Jupiter, but generally corresponded to one of the following: (1) simple rotation of field across the sheet, with an approximately southward direction in the sheet (generally northward beyond a distance from Jupiter of approximately 84 R sub j; (2) field having a southward component in a broad region near the sheet, but northward in a restricted region at the sheet itself; or (3) a clear bipolar variation of the sheet normal field component as the sheet was crossed (i.e., the field became northward and then southward, or vice versa, in crossing the sheet). S.L.

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-25640*# Grambling State Univ., La. Dept. of Physics.
TURBULENCE IN TRANSIENT SOLAR PHENOMENA Final Report, 1 Jan. 1980 - 30 Jul. 1982
Mark Cross 1982 36 p refs
(Grant NAG8-002)
(NASA-CR-170315; NAS 1.26:170315) Avail: NTIS HC A03/MF A01 CSCL 03B

If theta dependence is kept in the Navier-Stokes equations for the solar wind, than a density enhancement will grow. This growth is followed in the nonlinear equations until a streamer is formed. Viscosity stops the streamer's growth when there is a large difference in speeds inside and outside of the streamer. Using classical fluid mechanics and a latitude dependent hydrodynamical model, it is shown that unmagnetized perturbed flow evolves into high and low density regions. The growth mechanisms for density enrichments are discussed along with a nonlinear solution for their large amplitude development. It was found that a higher Reynolds number is needed to start turbulence in the presence of a magnetic field because energy is required to bend the field lines attached to the fluid. If cosmological gas was turbulent shortly after the big bang, then galaxies could have been formed by turbulent eddies. A.R.H.

N83-25641*# Colorado Univ., Boulder. Dept. of Astro-Geophysics.
TURBULENCE AND WAVE PARTICLE INTERACTIONS IN SOLAR-TERRESTRIAL PLASMAS Annual Status Report, 1 Jul. 1981 - 30 Jun. 1982
George A. Dulk [1982] 24 p refs
(Grant NAGw-91)
(NASA-CR-170339; NAS 1.26:170339; ASR-2) Avail: NTIS HC A02/MF A01 CSCL 03B

Theoretical modelling of two dimensional compressible convec-

tion in the Sun shows that convective flows can extend over many pressure scale heights without the nonlinear motions becoming supersonic, and that compressional work arising from pressure fluctuations can be comparable to that by buoyancy forces. These results are contrary to what was supposed in prevailing mixing length models for solar convection, and they imply a much greater degree of organized flow extending over the full depth of the convection zone. The nonlinear penetration of motions into the stable region below the convection zone was emphasized. These compressible flows are dominated by downward directed plumes in the unstable zone. Their strong penetration into the region of stable stratification below excites a broad spectrum of internal gravity waves there, and these in turn feed back upon the convection in the unstable zone to produce a rich time dependence. S.L.

N83-25642# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE BRAZILIAN SOLAR PHYSICS PROGRAM AND RESULTS FROM THE ENERGY OF SOLAR FLARES
P. Kaufmann Jan. 1983 31 p refs In PORTUGUESE; ENGLISH summary Sponsored in part by FINEP and FAPESP Submitted for publication
(INPE-2631-PRE/258) Avail: NTIS HC A03/MF A01

The solar physics program being developed in Brazil by the Instituto de Pesquisas Espaciais (INPE) is presented. The most recent results are presented with emphasis to those relative to energy production in solar explosions. Diagnostics obtained with unprecedented sensitivity and time resolution at millimeter microwaves, and at hard X-rays, appear to suggest that the impulsive phase of the explosions can be a response to multiple discrete injections quasi-quantized in energy, with various degrees of superposition. The first models reconciling these evidences are presented. Much data was acquired and interpretation is just beginning. Author

N83-25643# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
MICROWAVE AND X-RAY EMISSION DURING AN ISENTROPIC EXPANSION AND THEIR APPLICATION TO SOLAR FLARES Ph.D. Thesis - 4 Feb. 1982 [EMISSAO EM MICROONDAS E RAIOS-X DURANTE UMA EXPANSAO ISENTROPICA E SUA APLICACAO A EXPLOSOES SOLARES]
Liliana Rizzo Piazza 22 Feb. 1983 198 p refs In PORTUGUESE; ENGLISH summary
(INPE-2617-TDL/106) Avail: NTIS HC A09/MF A01

The gyro-synchrotron emission in microwaves and the free-free in X-rays of a plasma enclosed in a cylinder coincident with a magnetic force tube were calculated for an isentropic self-similar expansion, with plane and cylindrical symmetries. This expansion model was applied to a region of the low solar corona, and the results were compared to the emission observed in some simple solar events of low intensity. The calculations show satisfactory coincidence with the events in X-rays for energies around 10 to the 29th power ergs. The solar events analyzed in microwaves, which are not the same that were studied in X-rays, in general do not fit the theoretical results. The origin of the discrepancy is probably the formulation of the processes of emission applied to the expansion. M.G.

N83-25644# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
SUB-SECOND PULSATIONS SIMULTANEOUSLY OBSERVED AT MICROWAVES AND HARD X-RAYS IN A SOLAR BURST
T. Takakura (Tokyo Univ.), P. Kaufmann, J. E. R. Costa, S. S. Degaonkar (Tokyo Univ.), N. Ohki (Tokyo Univ.), and N. Nitta Nov. 1982 16 p refs Submitted for publication Sponsored in part by FINEP
(INPE-2672-PRE/281) Avail: NTIS HC A02/MF A01

Coordinated observations of solar bursts in November 1981 with a high time resolution of a few milliseconds were planned. The hard X-rays (30 to 40 keV) were observed with hard X-ray monitor (HXM) aboard the Hinotori Satellite with a time resolution of 7.81 ms and the radio emissions were observed on the ground with 45 ft dish at Itapetinga Radio Observatory with a high time resolution (1 ms) and high sensitivities at 22 GHz and 44 GHz, supplemented by a patrol observation at 7 GHz with time resolution of 100 ms. The pulsations repeated with a period of about 300 ms. The physical implication of the good correlation is not clear at this stage, but it may give a clue to the understanding of the high energy phenomena occurring during the solar flares. Author

N83-25645*# Stanford Univ., Calif. Inst. for Plasma Research.
THE STRUCTURE OF THE HELIOSPHERIC CURRENT SHEET, 1978 - 1982
J. Todd Hoeksema, John M. Wilcox, and Phillip H. Scherrer Apr. 1983 25 p refs Sponsored in part by Max C. Fleischmann Foundation
(Contracts NAS5-24420; N00014-76-C-0207
Grants NGR-05-020-559; NSF ATM-77-20580)
(NASA-CR-170307; NAS 1.26:170307; SU-IPR-Rept-956) Avail: NTIS HC A02/MF A01 CSCL 03B

The structure of the heliospheric magnetic field changes substantially during the 11 year sunspot cycle. Its configuration for the period 1976 through 1982 using a potential field model was calculated. The structure during the rising phase, maximum, and early decline of sunspot cycle 21, from 1978 to 1982 is considered. Author

N83-25646*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
THE PINHOLE/OCCULTER FACILITY
E. A. Tandberg-Hanssen, ed., H. S. Hudson, ed. (California Univ., San Diego), J. R. Dabbs, ed., and W. A. Baity, ed. (California Univ., San Diego) Apr. 1983 55 p refs
(NASA-TP-2168; NAS 1.60:2168) Avail: NTIS HC A04/MF A01 CSCL 03B

Scientific objectives and requirements are discussed for solar X-ray observations, coronagraph observations, studies of coronal particle acceleration, and cosmic X-ray observations. Improved sensitivity and resolution can be provided for these studies using the pinhole/occulter facility which consists of a self-deployed boom of 50 m length separating an occulter plane from a detector plane. The X-ray detectors and coronagraphic optics mounted on the detector plane are analogous to the focal plane instrumentation of an ordinary telescope except that they use the occulter only for providing a shadow pattern. The occulter plane is passive and has no electrical interface with the rest of the facility. A.R.H.

N83-25647# Aerospace Corp., El Segundo, Calif. Space Sciences Lab.
ELECTRON DENSITIES IN A SOLAR FLARE DERIVED FROM X-RAY SPECTRA
D. L. McKenzie, R. M. Broussard, P. B. Landecker, H. R. Rugge, R. M. Young, G. A. Doschek (NRL, Washington, D.C.), and U. Feldman (NRL, Washington, D.C.) 15 Jan. 1982 19 p refs
(Contract F04701-81-C-0082)
(AD-A111360; TR-0082(2940-01)-1; SD-TR-81-106) Avail: NTIS HC A02/MF A01 CSCL 03B

A major solar flare was observed with the RAP crystal of the SOLEX B spectrometer. The spectra were obtained by scanning back and forth between Bragg angles of 17.4 deg and 61.7 deg (7.8 to 23 A) at a rate of 0.525 degrees-.15. A full scan took 84.5 sec. A line list identifying more than 100 lines observed in this flare was compiled. Measurements of the density sensitive O 7 lines near 22 A are discussed. S.L.

N83-25648# Naval Research Lab., Washington, D. C. Center for Space Research.
THE SOLAR RADIATION FIELD AT TWILIGHT BELOW 100 KM: A SPHERICAL MODEL Final Report
Donald E. Anderson, Jr. FAA May 1982 17 p refs
(Contract DTFA01-81-Y-10512)
(AD-A122832; FAA-EE-82-18) Avail: NTIS HC A02/MF A01 CSCL 03/2

Time dependent calculations of minor species distributions

require as input the solar radiation field as a function of altitude and solar zenith angle. An isotropic spherical model of the radiation field has been developed to determine the solar radiation field in twilight. Comparison of the spherical model with a plane parallel model of the multiple scattering of radiation at twilight shows that: (1) for solar zenith angles less than 95 deg., plane parallel solutions are suitable if the initial deposition of solar energy is calculated for a spherical atmosphere; (2) for solar zenith angles greater than 95 deg., the plane parallel radiation field is several orders of magnitude smaller than that calculated with the spherical model; (3) at altitudes above 40 km, the spherical model predicts 10-20% less radiation than the radiation field calculated with the plane parallel model. Author (GRA)

N83-25649*# Stanford Univ., Calif. Inst. for Plasma Research.
ENERGY RELEASE IN SOLAR FLARES
P. A. Sturrock, P. Kaufmann (Conselho Nacional de Desenvolvimento Cientifico e Tecnologico, Sao Paulo, Brazil), and D. F. Smith (California Univ., Berkeley) Oct. 1982 31 p refs
(Grants NGL-05-020-272; NAGw-92; Contract N00014-75-C-0673)
(NASA-CR-170133; NAS 1.26:170133; AD-A122182; SU-IPR-933)
Avail: NTIS HC A03/MF A01 CSCL 03B

This report examines observational information concerning various phases of the solar-flare process: (a) Recent evidence strongly suggests that the soft X-ray emission before and after the impulsive phase should be regarded as one process--the gradual phase. (b) Microwave and X-ray data indicate that the impulsive phase is comprised of a large number of similar bursts of energy release. (c) Large flares are usually preceded by filament eruptions, and it is possible tht the same process occurs on a smaller scale for smaller flares. We propose that most flares are initiated by the eruption of a filament. The eruption opens up magnetic field lines to form a large current sheet. This current sheet may persist as a coronal streamer, or it may immediately reconnect. Reconnection of this current sheet is responsible for the gradual phase of a flare. Since magnetic field at the photospheric level is concentrated into small knots of high field strength, the coronal magnetic field may be regarded as an aggregation of small flux tubes, each with an internal current, adjacent tubes being separated by current sheets. The gradual phase of a flare may leave the fine-scale current system undisturbed, in which case the flare has only a gradual phase. GRA

93 SPACE RADIATION

Includes cosmic radiation; and inner and outer Earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine*. For theory see *73 Nuclear and High-Energy Physics*.

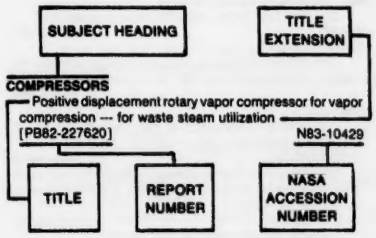
No abstracts in this category.

99 GENERAL

N83-25650*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LANGLEY TEST HIGHLIGHTS, 1982
May 1983 65 p refs
(NASA-TM-84655; NAS 1.15:84655) Avail: NTIS HC A04/MF A01 CSCL 05A

A 20 ft vertical spin tunnel, a 30 by 60 ft tunnel, a 7 by 10 ft high speed tunnel, a 4 by 7 meter tunnel, an 8 ft transonic pressure tunnel, a transonic dynamics tunnel, a 16 ft transonic tunnel, a national transonic facility, a 0.3 meter transonic cryogenic tunnel, a unitary plan wind tunnel, a hypersonic facilities complex, an 8 ft high temperature tunnel, an aircraft noise reduction lab, an avionics integration research lab, a DC9 full workload simulator, a transport simulator, a general aviation simulator, an advanced concepts simulator, a mission oriented terminal area simulation (MOTAS), a differential maneuvering simulator, a visual/motion simulator, a vehicle antenna test facility, an impact dynamics research facility, and a flight research facility are all reviewed.
Author

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABLATION
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144

ABLATIVE NOSE CONES
The effect of asymmetric attack on trim angle of attack
[NASA-TM-84309] N83-24473

ABRASIVES
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027

Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029

ABSORBENTS
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821

ABSORBERS (MATERIALS)
Dynamic behavior of particulate viscoelastic composites for sound absorption
[AD-A124272] N83-25502

ABSORPTION SPECTRA
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609

ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer
[DE82-020169] N83-24849

Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas
[DE82-020163] N83-25578

ABSORPTION SPECTROSCOPY
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842

Spectroradiometer measurements in support of photovoltaic device testing N83-25103

Differential-absorption LIDAR technology for light twin-engine aircraft operation
[DE83-003688] N83-25232

ABSORPTIVITY
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles
[NASA-CR-170338] N83-25505

ABUNDANCE
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638

ACCELERATED LIFE TESTS
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686

ACCELERATION PROTECTION
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365

ACCELERATION STRESSES (PHYSIOLOGY)
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365

ACCELEROMETERS
Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models
[N/FE123/S/PUB/77] N83-24517

Development of the charge amplifier for piezoelectric accelerometer sensors
[NAL-TR-749] N83-24832

ACCEPTABILITY
Visual judgments of optical distortions in aircraft windscreens
[AD-A124307] N83-24503

ACCUMULATORS
Two hundred passage three-way valve: Fraction collector N83-24894

ACCURACY
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831

Accuracy and completeness of problem solutions with example-solutions
[AD-A124087] N83-25463

Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544

ACID RAIN
Acid rain: Commentary on controversial issues and observations on the role of fuel burning
[DE82-016914] N83-25219

The long range transport of air pollution
[DOE/EP-0037] N83-25221

Acid rain: A background report
[DE83-901079] N83-25236

ACOUSTIC PROPERTIES
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740

ACTIVATED CARBON
Uranium from seawater
[DE83-000658] N83-24595

ACTIVATION
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574

ACTIVE CONTROL
ACOSS-16 (Active Control of Space Structures)
[AD-A123540] N83-24546

ACOSS fifteen (Active Control of Space Structures)
[AD-A123530] N83-24547

ACTUATOR DISKS
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859

ACTUATORS
Modular design attitude control system
[NASA-CR-170736] N83-24541

The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881

A broadbased actuator concept for spaceflight application N83-24885

The linear boom actuator designed for the Galileo spacecraft N83-24886

Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24888

Cannon launched electromechanical control actuation system development N83-24893

Design of the Galileo remote science pointing actuators N83-24902

ADA (PROGRAMMING LANGUAGE)
Large scale software system design of the missile minder AN/TSQ-73 using the Ada programming language
[AD-A123308] N83-25410

ADAPTATION
The effect of random steering vector errors in the Applebaum adaptive array
[AD-A124282] N83-24743

Space Physiology and Medicine
[NASA-SP-447] N83-25349

ADAPTIVE CONTROL
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546

ADAPTIVE FILTERS
Research on algorithms for adaptive array antennas
[AD-A123419] N83-24759

ADDITIVES
Effect of additives on performance of hydrated salt TES systems N83-25075

Developments toward an 18% efficient silicon solar cell
[NASA-CR-168141] N83-25112

ADHESION TESTS
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703

ADHESIVE BONDING
Integrated methodology for adhesive bonded joint life predictions
[AD-A124324] N83-24701

Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703

Design and fabrication of realistic adhesively bonded joints
[NASA-CR-166099] N83-24876

ADHESIVES
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193

ADIABATIC CONDITIONS
Adiabatic deformation and strain localization
[AD-A123695] N83-24818

ADSORBENTS
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes
[DE83-005635] N83-25536

ADSORPTION
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580

Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586

Uranium from seawater
[DE83-000658] N83-24595

Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519
ADVECTION
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321
AERATION
Lubricant foaming and aeration study
[AD-A124184] N83-24696
AERIAL EXPLOSIONS
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712
AERIAL PHOTOGRAPHY
Scene classification results using the max-min texture measure
[AD-A123496] N83-25008
Temporal image normalization
[AD-A123313] N83-25010
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data
[DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
AERIAL RECONNAISSANCE
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 1: General narrative report
[DE82-011041] N83-25014
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
AERODYNAMIC BALANCE
The effect of asymmetric attack on trim angle of attack
[NASA-TM-84309] N83-24473
AERODYNAMIC CHARACTERISTICS
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics --- Langley 16-ft transonic tunnel tests
[NASA-TP-2158] N83-24478
AERODYNAMIC COEFFICIENTS
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
AERODYNAMIC CONFIGURATIONS
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
AERODYNAMIC DRAG
A study of the effects of Lebu devices on turbulent boundary layer drag
[NASA-CR-170313] N83-24469
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803
AERODYNAMIC LOADS
Computer prediction of store aerodynamic loading during separation
[AD-A124693] N83-24483
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
AERODYNAMICS
Aeronautical Engineering. A continuing bibliography with indexes, supplement 160, April 1983
[NASA-SP-7037(160)] N83-24466
AEROELASTICITY
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479
AERONAUTICAL ENGINEERING
Aeronautical Engineering. A continuing bibliography with indexes, supplement 160, April 1983
[NASA-SP-7037(160)] N83-24466
AEROSOLS
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578
Aerosol measurements with a high resolution spectrometer. Environmental research papers
[AD-A123691] N83-25248
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980)
[AD-A123517] N83-25323
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556
AEROSPACE ENGINEERING
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(07)] N83-24525
AEROSPACE ENVIRONMENTS
Space Physiology and Medicine
[NASA-SP-447] N83-25349
AEROSPACE MEDICINE
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345
Aerospace Medicine and Biology: A cumulative index to the 1982 issues
[NASA-SP-7011(241)] N83-25347
Space Physiology and Medicine
[NASA-SP-447] N83-25349
AEROSPACE VEHICLES
Experimental design of an interlaboratory study for trace metal analysis of liquid fluids --- for aerospace vehicles
[NASA-TP-2148] N83-24575
AEROSTATICS
Cold weather aerostat study
[AD-A123407] N83-24484
AEROTHERMODYNAMICS
Opportunities for research in aerothermodynamics
[NASA-TM-83348] N83-24506
Aerothermal environment in control surface gaps in hypersonic flow: An overview
[NASA-TM-84662] N83-24794
Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814
AFTERBODIES
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics --- Langley 16-ft transonic tunnel tests
[NASA-TP-2158] N83-24478
AGGLOMERATION
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617
AGING (MATERIALS)
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
Propellant surveillance report LGM-30 F & G stage 1, phase G, series I, TP-H1011
[AD-A123315] N83-24713
Flight systems safety program
[DE82-021833] N83-25529
AGING (METALLURGY)
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191
AGREEMENTS
Overview of the Mexican-American cooperative program at the Cerro Prieto geothermal field N83-24977
AGRICULTURE
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
Geothermal development plan: Cochise/Santa Cruz Counties
[DE83-004880] N83-25206
Geothermal development plan: Yuma County
[DE83-004882] N83-25208
Summary of requirements and recommendations N83-25270
Precipitation data for climate diagnostics N83-25278
AGRISTARS PROJECT
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
AH-64 HELICOPTER
Pilot selection criteria for the AH-64 helicopter
[AD-A122495] N83-25371
AIR
Severe storms requirements for precipitation information N83-25281
AIR CONDITIONING EQUIPMENT
Chemical heat pump cost effectiveness evaluation N83-25067
AIR COOLING
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24656
AIR FLOW
Experimental investigation of high performance, short, thrust augmenting ejectors --- V/STOL aircraft
[AD-A125529] N83-24809
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539
AIR POLLUTION
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
The long range transport of air pollution
[DOE/EP-0037] N83-25221
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231
Differential-absorption LIDAR technology for light twin-engine aircraft operation
[DE83-003888] N83-25232
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260
AIR QUALITY
Environmental monitoring
[DE82-021559] N83-25228
AIR SAMPLING
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217
AIR TRAFFIC CONTROL
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
Advanced Automation System (AAS) transition strategy
[FAA-AP-83-1] N83-24493
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A
[FAA-PM-83-19-REV-A] N83-24494
An analysis of reports of operational errors
[AD-A123416] N83-24499
National Airspace System Plan, facilities, equipment and associated development N83-24521
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
AIR TRAFFIC CONTROLLERS (PERSONNEL)
An analysis of reports of operational errors
[AD-A123416] N83-24499
AIR WATER INTERACTIONS
A survey of radar rain measurement techniques N83-25290
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321
AIRBORNE EQUIPMENT
Power conditioning subsystem design
[AD-A124191] N83-25113
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
AIRBORNE/SPACEBORNE COMPUTERS
Interface specifications for the SCR (A-7E) extended computer module
[AD-A123566] N83-25411
AIRCRAFT ACCIDENT INVESTIGATION
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488

Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489

AIRCRAFT APPROACH SPACING
National Airspace System Plan, facilities, equipment and associated development N83-24521

AIRCRAFT DESIGN
Improved design of subcritical and supercritical cascades using complex characteristics and boundary layer correction
[NASA-CR-168166] N83-24474
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514

AIRCRAFT ENGINES
Opportunities for research in aerothermodynamics
[NASA-TM-83348] N83-24506
Advanced electrical power system technology for the all electric aircraft
[NASA-TM-83390] N83-24764

AIRCRAFT EQUIPMENT
Visual judgments of optical distortions in aircraft windscreens
[AD-A124307] N83-24503

AIRCRAFT FUELS
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170280] N83-24711

AIRCRAFT HAZARDS
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268

AIRCRAFT LANDING
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268

AIRCRAFT NOISE
Limits on the prediction of helicopter rotor noise using thickness and loading sources: Validation of helicopter noise prediction techniques
[NASA-CR-166097] N83-25498
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

AIRCRAFT PILOTS
Pilot selection criteria for the AH-64 helicopter
[AD-A122495] N83-25371

AIRCRAFT SAFETY
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489
Advanced Automation System (AAS) transition strategy
[FAA-AP-83-1] N83-24493
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A
[FAA-PM-83-19-REV-A] N83-24494
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265

AIRFOIL PROFILES
Computer programs for generation and evaluation of near-optimum vertical flight profiles
[NASA-CR-3688] N83-24500

AIRFOILS
Improved design of subcritical and supercritical cascades using complex characteristics and boundary layer correction
[NASA-CR-168166] N83-24474
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803

AIRFRAMES
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123166] N83-24646

AIRGLOW
Low light level imaging design
[AD-A124283] N83-25547

AIRPORTS
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

AIRSPACE
Advanced Automation System (AAS) transition strategy
[FAA-AP-83-1] N83-24493

AIRSPEED
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539

ALASKA
LANDSAT-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska
[AD-A123440] N83-25011

ALBEDO
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005

ALCOHOLS
Catalysts for alcohols from biomass
[DE83-003611] N83-24630
Distilling alcohol with waste automobile heat
[DE82-018727] N83-24716
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717

ALGORITHMS
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502
Standarized EMCS energy savings calculations
[AD-A123383] N83-24731
Research on algorithms for adaptive array antennas
[AD-A123419] N83-24759
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
Simple one-dimensional inversions of magnetotelluric data N83-24962
Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386
Some remarks on the Herlestam-Johannesson algorithm for computing logarithms over GF(2P)
[DE82-020628] N83-25423
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques
[INPE-2710-PRE/298] N83-25437
Hidden line elimination in projected grid surfaces
[AD-A124348] N83-25447

ALIGNMENT
Control of large thermal distortions in a cryogenic wind tunnel N83-24889
Catalog of automatic Sun-following trackers — for monitoring solar radiation and alignment of solar collectors
[DE83-005529] N83-25178
Rotary target v-block — wind tunnel apparatus
[NASA-CASE-LAR-12007-3] N83-25542

ALIPHATIC COMPOUNDS
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622

ALKALI METAL COMPOUNDS
Applications of ion chromatography
[DE83-004942] N83-24632
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675

ALKALIES
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
Enhanced recovery of heavy oils with alkali N83-24987
Thermal conductivity of molten alkali nitrates N83-25084

ALKALINE BATTERIES
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries
[NASA-TM-83386] N83-24571

ALKALINE EARTH METALS
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691

ALKALINITY
Development of an efficient coal-desulfurization process: Oxy-alkalinolysis
[DE82-016384] N83-24623

ALLOYS
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C)
[NASA-TM-83355] N83-24638
Alloy development for irradiation performance
[DE83-006357] N83-24648
Neutron source characterization for materials experiments N83-24649
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres
[DE82-905772] N83-25182
Experiments in high-voltage electron microscopy
[DE83-005283] N83-25612

ALTERNATING CURRENT
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768

ALTERNATIVES
Alternatives to ceramic bricks and ceramic brick systems N83-25071

ALTIMETERS
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310

ALTITUDE
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357

ALUMINATES
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704

ALUMINUM
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
Two hundred passage three-way valve: Fraction collector N83-24894
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080

ALUMINUM ALLOYS
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123166] N83-24646
Powder-metallurgy-processed A15 Nb3Al superconducting wires
[DE82-022057] N83-24682
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919
Measurement of residual stress using the temperature dependence of ultrasonic velocity
[AD-A123694] N83-25593

ALUMINUM ARSENIDES
Reading and writing of photochemical holes using GaAlAs diode lasers
[AD-A124633] N83-24846

ALUMINUM GALLIUM ARSENIDES
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence — for laser devices
[AD-A124300] N83-24582

ALUMINUM OXIDES
Ceramic-metal solid electrolytes
[DE82-009034] N83-24591
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering — selective absorber coatings of alumina-metal-alumina
[DE83-005692] N83-24687
Advanced-fuel-cell development
[DE82-021146] N83-25131
Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25589

AMAZON REGION (SOUTH AMERICA)
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
Amtospheric correction analysis on LANDSAT data over the Amazon region --- Manaus, Brazil
[E83-10298] N83-25001
AMBIENCE
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542
AMBIENT TEMPERATURE
Ambient temperature stress-corrosion cracking of sensitized stainless steels
[DE82-006846] N83-24679
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
AMINO ACIDS
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344
AMMONIA
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630
AMORPHOUS MATERIALS
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
AMORPHOUS SEMICONDUCTORS
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors
[DE83-004523] N83-25611
AMPLITUDE DISTRIBUTION ANALYSIS
Data analysis using multiple filters
[DE82-021948] N83-25425
ANALOG TO DIGITAL CONVERTERS
Improvement of the narrowband linear predictive coder. Part 1: Analysis improvements
[AD-A124313] N83-24758
ANALYSIS OF VARIANCE
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479
ANALYTIC FUNCTIONS
N-width and entropy of H(p)-classes in L(g) (-1,1)
[AD-A124346] N83-25445
ANGLE OF ATTACK
The effect of asymmetric attack on trim angle of attack
[NASA-TM-84309] N83-24473
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack
[AD-A123389] N83-24485
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24808
ANGLES (GEOMETRY)
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543
The solar radiation field at twilight below 100 KM: A spherical model
[AD-A122832] N83-25648
ANGULAR MOMENTUM
A compact magnetic bearing for gimballed momentum wheel N83-24903
Behavior of nuclei at high angular momentum
[DE82-020267] N83-25514
ANIMALS
Study of behavioral modifications resulting from exposure to high let radiation
[NASA-CR-171651] N83-25350
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368
ANISOTROPY
Stresses during fabrication of cylindrically woven carbon-carbon composites
[AD-A123153] N83-24567
Orientation of ceramic microstructures by hot-forming methods
[DE83-005232] N83-24707
Advances and trends in plate buckling research
[AD-A123358] N83-24909
Research on turbulence in plasma
[NASA-CR-170260] N83-25561
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594
ANNEALING
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Study of ohmic contacts on Si(28) - Implanted GaAs
[AD-A124689] N83-25595
ANNUAL VARIATIONS
A brief review of the present status of global precipitation estimates N83-25276
On the effect of temporal sampling on the observation of mean rainfall N83-25285
Diurnal variability of wind velocity increase with height
[DE83-005604] N83-25336
Oceanographic observations North Pacific Ocean Station November and Pacific Standard Monitoring Sections P3, P4, P5, and P6, July 1966 - June 1974
[AD-A122224] N83-25342
ANODES
Applied battery and electrochemical research program
[DE82-020600] N83-25132
ANOMALIES
The indirect effects on the computation of geoid undulations
[NASA-CR-170347] N83-25006
ANTARCTIC REGIONS
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343
ANTENNA ARRAYS
The effect of random steering vector errors in the Applebaum adaptive array
[AD-A124282] N83-24743
Research on algorithms for adaptive array antennas
[AD-A123419] N83-24759
ANTENNA COMPONENTS
Electrically small antennas
[AD-A124364] N83-24744
Research on algorithms for adaptive array antennas
[AD-A123419] N83-24759
ANTENNA DESIGN
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(07)] N83-24525
ANTENNA RADIATION PATTERNS
Performance interface document for users of Tracking and Data Relay Satellite System (TDRSS) electromechanically steered antenna systems (EMSAS)
[NASA-TM-84953] N83-24545
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target
[AD-A124323] N83-24755
Analysis of the suspended H-waveguide and other related dielectric waveguide structures
[AD-A124342] N83-24757
ANTENNAS
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna
[DOT/FAA/PM-83/18] N83-24492
Electrically small antennas
[AD-A124364] N83-24744
Impedance and current of insulated and end-grounded linear antennas in seawater
[AD-A123345] N83-24751
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
ANTIGRAVITY
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365
ANTIMISSILE DEFENSE
Simulated blast testing of advance interceptor materials
[AD-A124374] N83-24563
ANTIMISTING FUELS
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170260] N83-24711
APPLICATIONS PROGRAMS (COMPUTERS)
Cumulative reports and publications thru 31 December 1982
[NASA-CR-166116] N83-25377
APPROACH
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500
APPROACH CONTROL
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
APPROACH INDICATORS
Evaluation of Precision Approach Path Indicator (PAPI)
[FAA-CT-82-153] N83-24495
APPROPRIATIONS
National Aeronautics and Space Administration Authorization Act, 1983 N83-25622
APPROXIMATION
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force)
[NAL-TR-751] N83-24475
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A123541] N83-24577
Two approximations of solutions of Hamilton-Jacobi equations
[AD-A124359] N83-25464
the effect of changing step size on the accuracy of multistep formulas
[DE82-020884] N83-25474
AQUEOUS SOLUTIONS
Thermodynamics of high-temperature brines N83-24982
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Chemistry of nuclear waste substances in aqueous solutions N83-24986
AQUICULTURE
Environmental Sciences Division report
[ORNL-5900] N83-25218
AQUIFERS
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Simulation of thermal energy storage in a doublet well system N83-24973
A dimensionless parameter approach to the thermal behavior of an aquifer thermal energy storage system N83-24974
The characterization of heat storage in confined aquifers with buoyancy flow N83-24975
A comparative study of four major approaches to predicting ATES performance N83-24976
Dickinson geothermal study
[DE82-016945] N83-25018
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201
ARCHITECTURE
CAM highlights, FY 82
[AD-A123395] N83-25417
ARCHITECTURE (COMPUTERS)
Massively parallel processor computer
[NASA-CASE-GSC-12223-1] N83-25378
Implementation of a fully reconfigurable multimicroprocessor
[DE82-021769] N83-25384
AREA NAVIGATION
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
ARGON
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640

Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605

ARIZONA
Geothermal development plan: Northern Arizona counties
[DE83-004878] N83-24554
Potential of utilization of geothermal energy in Arizona
[DE83-004875] N83-25119
Geothermal development plan: Pinal County
[DE83-004879] N83-25205
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207

ARKANSAS
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2
[DE82-016339] N83-25185

ARMED FORCES (UNITED STATES)
Remote sensing of battlefield weather conditions using unmanned air vehicles
[AD-A124275] N83-25326

ARRAYS
Pyroelectric detector arrays
[NASA-CASE-LAR-12363-2] N83-24763
Synchronizing large systolic arrays
[AD-A123374] N83-24780

ARROW WINGS
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479

ARTIFICIAL SATELLITES
Atmospheric drag effects on the motion of an artificial Earth satellite
[NAL-TR-748] N83-24534
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901
A compact magnetic bearing for gimballed momentum wheel N83-24903

ASCENT
Vector wind profile gust model
[NASA-CR-170762] N83-25320

ASCENT TRAJECTORIES
Ascent trajectory dispersion analysis
[NASA-CR-170741] N83-24529

ASSEMBLY LANGUAGE
A VAX assembler for the Intel 8748 microcomputer
[AD-A123378] N83-25404

ASSESSMENTS
An assessment of the basic energy science program. Volume 1: Technical Report
[DOE/ER-0123] N83-25056
A value-assessment aid to complex decision making
[DE82-905815] N83-25490

ASTRONOMICAL CATALOGS
A Catalog of Selected Viking Orbiter Images
[NASA-RP-1093] N83-25636

ASTRONOMICAL OBSERVATORIES
Research in planetary astronomy and operation of Mauna Kea Observatory
[NASA-CR-170246] N83-25631

ASTRONOMICAL PHOTOMETRY
Properties of young clusters near reflection nebulae
[NASA-CR-170305] N83-25628

ASTRONOMICAL SPECTROSCOPY
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630

ASTROPHYSICS
Research in particles and fields
[NASA-CR-170335] N83-25634
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640

ASYMPTOTIC METHODS
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432
Asymptotic spectral analysis of cross-product matrices
[AD-A123438] N83-25485

ATLANTIC OCEAN
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921

ATMOSPHERIC ATTENUATION
Amtospheric correction analysis on LANDSAT data over the Amazon region --- Manaus, Brazil
[E83-10298] N83-25001
Ground truth for oceanic rainfall N83-25291

ATMOSPHERIC BOUNDARY LAYER
MONEX79 atmospheric boundary-layer experiment over the Bay of Bengal: Digha data report
[DE83-005456] N83-25335

ATMOSPHERIC CHEMISTRY
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260

ATMOSPHERIC CIRCULATION
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980)
[AD-A123517] N83-25323
Atmospheric transport and dispersion model: User's manual
[AD-A123352] N83-25324

ATMOSPHERIC COMPOSITION
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217

ATMOSPHERIC CONDUCTIVITY
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260

ATMOSPHERIC EFFECTS
Progress in the development of standad procedures for the global method of calibration of photovoltaic reference cells N83-25108

ATMOSPHERIC ENTRY
The effect of asymmetric attack on trim angle of attack
[NASA-TM-84309] N83-24473

ATMOSPHERIC MODELS
Terrestrial solar spectral modeling N83-25104
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Tides in the thermosphere: A review. Environmental research papers
[AD-A124314] N83-25252
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255

ATMOSPHERIC RADIATION
Project Biramis: Measurement of the Earth radiation budget by accelerometric satellite
[ESA-TT-761] N83-25243

ATMOSPHERIC REFRACTION
Guidelines for correction of radiosonde-derived refractive profiles and climatologies
[AD-A124351] N83-25322

ATMOSPHERIC SCATTERING
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25467

ATMOSPHERIC SOUNDING
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255
AVE/VAS 4: 25-mb sounding data
[NASA-CR-170739] N83-25266
AVE/VAS 5: 25-mb sounding data
[NASA-CR-170740] N83-25267

ATMOSPHERIC STRATIFICATION
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321

ATMOSPHERIC TEMPERATURE
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature --- central Russian steppes, and high plains of Montana, North Dakota, and Canada
[E83-10297] N83-25000
Carbon Dioxide Effects Research and Assessent Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222
Situation climatic briefs
[AD-A123369] N83-25330

ATMOSPHERIC TIDES
Tides in the thermosphere: A review. Environmental research papers
[AD-A124314] N83-25252

ATMOSPHERIC TURBULENCE
Research, design and development study to measure atmospheric optical turbulence
[AD-A123392] N83-25256

ATOMIC COLLISIONS
Inner shells as a link between atomic and nuclear physics
[DE83-004560] N83-25523
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524

ATOMIC PHYSICS
Inner shells as a link between atomic and nuclear physics
[DE83-004560] N83-25523

ATOMIC STRUCTURE
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602

ATOMIC WEIGHTS
Massive or weighty problem of atomic weight: It's a dimensionless dilemma
[DE82-020741] N83-25510

ATTITUDE CONTROL
Modular design attitude control system
[NASA-CR-170736] N83-24541
A compact magnetic bearing for gimballed momentum wheel N83-24903

AUDITORY PERCEPTION
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740
Longitudinal study of human hearings: Its relationship to noise and other factors. 3: Results from the first five years
[AD-A123175] N83-25355

AUGER SPECTROSCOPY
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693

AURORAL ZONES
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901

AURORAS
Structure and dynamics of the winter polar cap F region
[AD-A123706] N83-25247
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249
Low light level imaging design
[AD-A124283] N83-25547

AUSTENITE
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666

AUSTENITIC STAINLESS STEELS
Operation of the ORR spectral tailoring experiments ORR-MFE-4A and ORR-MFE-4B N83-24650
Environmental effects on properties of structural alloys N83-24672
Compatibility studies of structural alloys with solid breeder N83-24674
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681

AUTOMATED RADAR TERMINAL SYSTEM
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A
[FAA-PM-83-19-REV-A] N83-24494

AUTOMATIC CONTROL
Advanced Automation System (AAS) transition strategy
[FAA-AP-83-1] N83-24493
Automation of the DMA list of lights and radio navigational aids
[AD-A124199] N83-24496
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774
Conversion of existing continuous control systems into digital control systems
[AD-A123167] N83-24783
An automatic temperature-calibration system
[DE82-021953] N83-24840
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25128

AUTOMATIC GAIN CONTROL
Improvement of the narrowband linear predictive coder. Part 1: Analysis improvements
[AD-A124313] N83-24758

AUTOMATIC TEST EQUIPMENT
CAM highlights, FY 82
[AD-A123395] N83-25417

AUTOMOBILE ENGINES
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625

AUTOMOBILE FUELS
Distilling alcohol with waste automobile heat
[DE82-018727] N83-24716

AVAILABILITY
Reliability and availability evaluation program manual
[AD-A124294] N83-24869
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020
Geothermal development plan: Pinal County
[DE83-004879] N83-25205

AVALANCHE DIODES
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24761

AVIONICS
Demonstration Advanced Avionics System (DAAS). Phase 1 report
[NASA-CR-170317] N83-24504

AVOIDANCE
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345

AXES OF ROTATION
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151

AXIAL FLOW TURBINES
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine
[NASA-TM-83359] N83-24505

AXIAL LOADS
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914

AXIAL STRESS
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019108] N83-24568

AXISYMMETRIC BODIES
Consolidation of axi-symmetric bodies subjected to non axi-symmetric loading
[RR-CE-20] N83-24879

AZIMUTH
Spectroradiometer measurements in support of photovoltaic device testing N83-25103

B

BABOONS
Analysis of long bone and vertebral failure patterns
[AD-A123163] N83-25356

BACK INJURIES
Analysis of long bone and vertebral failure patterns
[AD-A123163] N83-25356

BACKGROUND NOISE
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263

BACKGROUND RADIATION
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253

BACKSCATTERING
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A123541] N83-24577
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24746
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
Reverberation research overview
[AD-A123351] N83-25501

BACTERIA
Environmental Sciences Division report
[ORNL-5900] N83-25218

BAFFLES
Liquid helium management for Gravity Probe-B
[NASA-TM-82521] N83-24830

BALLISTIC TRAJECTORIES
Advances in techniques for tracking and terminal state estimation of a goal seeking vehicle (The Target RV) via an optimal BMD intercept vehicle filter
[AD-A124628] N83-24548

BALLISTICS
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502

BALLOON-BORNE INSTRUMENTS
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Aerosol measurements with a high resolution spectrometer. Environmental research papers
[AD-A123691] N83-25248

BALLOONS
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Cold weather aerostat study
[AD-A123407] N83-24484

BAND STRUCTURE OF SOLIDS
Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604

BANDPASS FILTERS
Data analysis using multiple filters
[DE82-021948] N83-25425

BANDWIDTH
Increasing the effective bandwidth of a laser-fusion driver
[DE82-015170] N83-24847

BARIUM TITANATES
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039

BARYONS
Alloy development for irradiation performance
[DE83-006357] N83-24648

BASALT
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638

BATCH PROCESSING
Using a batch processor to create an interactive menu-driven operating system
[LA-9205-MS] N83-25381
Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386

BATTERY CHARGERS
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169

BEACHES
A model for on-offshore sediment transport in the surfzone
[AD-A124235] N83-25340

BEADS
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695

BEAM CURRENTS
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
Application of Robertson's collective focusing to final focusing
[DE83-004050] N83-25522

BEAM INJECTION
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848

BEAM SPLITTERS
Spectrophotovoltaic orbital power generation
[NASA-CR-170754] N83-25040

BEARING ALLOYS
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698

BEARINGS
Evaluation of scanning earth sensor mechanism on engineering test satellite 4 N83-24890
A compact magnetic bearing for gimballed momentum wheel N83-24903

BEDROCK
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999

BEDS (PROCESS ENGINEERING)
Continuous chemical-reaction chromatography
[DE82-010447] N83-24594
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825

BEHAVIOR
Study of behavioral modifications resulting from exposure to high let radiation
[NASA-CR-171651] N83-25350

BENDING
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending
[NASA-TM-83059] N83-24874

BENDING MOMENTS
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892

BERYLLIUM
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685

BESSEL FUNCTIONS
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460

BETA FACTOR
Ceramic-metal solid electrolytes
[DE82-009034] N83-24591

BETA PARTICLES
Silicon carbide-reinforced plastic material
[DE83-004944] N83-24570

BIBLIOGRAPHIES
Aeronautical Engineering. A continuing bibliography with indexes, supplement 160, April 1983
[NASA-SP-7037(160)] N83-24486
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(07)] N83-24525
Annotated bibliography: Polymers in concrete
[AD-A123414] N83-24702
Energy. A continuing bibliography with indexes, issue 36, January 1983
[NASA-SP-7043(36)] N83-25025
Community energy management: An annotated bibliography
[ANL/CNSV-29] N83-25046
Aerospace Medicine and Biology: A cumulative index to the 1982 issues
[NASA-SP-7011(241)] N83-25347

BIOCHEMISTRY
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357

BIODYNAMICS
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351

BIOLOGICAL EFFECTS
Two hundred passage three-way valve: Fraction collector N83-24894
Aerospace Medicine and Biology: A cumulative index to the 1982 issues
[NASA-SP-7011(241)] N83-25347
Biological effects of static magnetic fields: A selective review with emphasis on risk assessment
[DE82-013350] N83-25367

BIOLOGICAL EVOLUTION
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556

BIOMASS
Catalysts for alcohols from biomass
[DE83-003611] N83-24630
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144

BIOPHYSICS
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493

BIOSPHERE
Global Dynamics of Biospheric Carbon. Proceedings of Symposium
[CONF-8108131] N83-25223

BIOTITE
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948

BISMUTH COMPOUNDS
Orientation of ceramic microstructures by hot-forming methods
[DE83-005232] N83-24707

BITUMENS
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-021276] N83-24597
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231

BIVARIATE ANALYSIS
Simulation analysis of some outlier detection methods
[ORNL/CSO/TM-143] N83-25434

Hidden line elimination in projected grid surfaces
[AD-A124348] N83-25447

BLASIUS FLOW
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797

BLAST LOADS
Simulated blast testing of advance interceptor materials
[AD-A124374] N83-24563
Calculation of wing response to gusts and blast waves with vortex lift effect
[NASA-CR-170340] N83-24796

BLOOD PLASMA
Salivary and plasma testosterone and cortisol during moderately heavy excercise
[AD-A122107] N83-25352
L-tryptophan: Effects on daytime sleep latency and the waking EEG
[AD-A123633] N83-25354

BLUFF BODIES
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803

BODIES OF REVOLUTION
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack
[AD-A123389] N83-24485

BODY TEMPERATURE
Data acquisition and analysis software for thermal stress studies
[AD-A122567] N83-25361

BODY-WING CONFIGURATIONS
Calculation of transonic potential flow around a wing-body-tail combination
[AD-A124247] N83-24482

BOILERS
Analytical studies for the H-coal process
[DE82-019835] N83-24601
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions
[DE83-900751] N83-24616
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211

BOILING
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity
[DE82-020758] N83-24612
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-019722] N83-24621

BOMBS (ORDNANCE)
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732

BONDING
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602

BOOLEAN ALGEBRA
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461

BOOMS (EQUIPMENT)
Tethered satellite control mechanism N83-24882
The linear boom actuator designed for the Galileo spacecraft N83-24886
Nutation Damper System N83-24895
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901

BOREHOLES
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Geophysical borehole measurements in low-permeability rock N83-24955
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
The measurement of in situ stress using NQR/NMR N83-24991
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023
Advanced wellbore thermal simulator GEOTEMP2 research report
[DE82-020050] N83-25154

BORESIGHT ERROR
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745

BORON
Applications of ion chromatography
[DE83-004942] N83-24632

BORON ISOTOPES
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508

BOROSILICATE GLASS
Waste glasses-requirements and characteristics
[DE82-014855] N83-25528

BOULES
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Silicon slicing by fixed abrasive slicing technique N83-25030

BOUNDARY LAYER FLOW
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814
An experimental study of the dynamics of an unsteady turbulent boundary layer
[NASA-CR-170278] N83-24816

BOUNDARY LAYER STABILITY
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640

BOUNDARY LAYERS
End-wall boundary layer measurements in a two-stage fan
[NASA-TM-83409] N83-24470
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432

BOUNDARY VALUE PROBLEMS
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432
Initial boundary value problems for the equations of motion of compressible viscous and heat-conductive fluids
[AD-A124382] N83-25440
A diffusion equation with a nonmonotone constitutive function
[AD-A124345] N83-25444
Using the method-of-lines technique to solve initial-boundary-value partial differential equations
[DE82-020909] N83-25472
the effect of changing step size on the accuracy of multistep formulas
[DE82-020884] N83-25474

BRAKES (FOR ARRESTING MOTION)
Calibrator for an electromagnetically braked bicycle ergometer
[AD-A122511] N83-25363

BRANCHING (MATHEMATICS)
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225

BRASSES
Electrochemical aspects of stress-corrosion crack growth
[DE82-021543] N83-24680

BRAYTON CYCLE
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089
Cost and performance of thermal storage concepts in solar thermal systems N83-25090

BRAZIL
Methodology of remote sensing data interpretation and geological applications --- Brazil
[E83-10299] N83-25002
Microwave laboratory computer program library
[INPE-2613-NTE/195] N83-25390
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques
[INPE-2710-PRE/298] N83-25437

BRAZILIAN SPACE PROGRAM
Perspectives in remote sensing in Brazil. An approach of the remote sensing applications to Earth resources surveys
[E83-10290] N83-24994
The Brazilian Solar Physics Program and results from the energy of solar flares
[INPE-2631-PRE/258] N83-25642

BREEDER REACTORS
Compatibility studies of structural alloys with solid breeder N83-24674
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684

BREMSSTRAHLUNG
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571

BRICKS
Evaluation of olivine refractories for TES N83-25070
Alternatives to ceramic bricks and ceramic brick systems N83-25071
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072

BRIDGES (STRUCTURES)
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789

BRIGHTNESS
Microspectroscopy
[DE82-020158] N83-24814

BRIGHTNESS TEMPERATURE
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature --- central Russian steppes, and high plains of Montana, North Dakota, and Canada
[E83-10297] N83-25000
Global weather requirements for precipitation measurements N83-25282
Raingage network sampling statistics N83-25286
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303

BRILLOUIN EFFECT
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer
[DE82-020169] N83-24849

BRINES
Fluid sampling and analysis of geopressured brine N83-24972
Thermodynamics of high-temperature brines N83-24982

BRITTLENESS
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123166] N83-24646
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668

BROADBAND
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550

BROMINE COMPOUNDS
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597

BUBBLES
Swelling and microstructural development in path A PCA and type 316 stainless steel irradiated in HFIR to about 22 dpa N83-24654
Vapor cavitation in dynamically loaded journal bearings
[NASA-TM-83366] N83-24875

BUCKLING
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
The design of single angle struts
[RR-CE-19] N83-24877
Advances and trends in plate buckling research
[AD-A123358] N83-24909

BUILDINGS
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159

Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195

BUMPY TORUSES
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571
Studies of accelerated compact toruses
[DE83-005488] N83-25584

BUOYANCY
The characterization of heat storage in confined aquifers with buoyancy flow N83-24975

BYPASS RATIO
Research and development of the turbofan engine (the 2nd phase, FJR 710)
[NAL-TR-741] N83-24508

C

CABLES (ROPES)
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester
[AD-A124267] N83-24835

CADMIUM SULFIDES
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191

CALCIUM COMPOUNDS
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704

CALCULATORS
A system for developing HP41CV hand-held calculator programs on an HP9845 desktop computer
[DE83-005360] N83-25426

CALCULUS
Highlights of the history of the lambda-calculus
[AD-A124383] N83-25441

CALIBRATING
Remote calibration of torque wrenches in a hostile environment
[RFP-3296] N83-24831
Calibration of the active radiation detector for Spacelab-One
[NASA-CR-170752] N83-24833
An automatic temperature-calibration system
[DE82-021953] N83-24840
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105
Source for reference cells N83-25106
Calibrator for an electromagnetically braked bicycle ergometer
[AD-A122511] N83-25363

CANOPIES (VEGETATION)
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005

CANTILEVER BEAMS
Payload retention fittings for space shuttle payload ground handling mechanism N83-24906

CAPILLARY FLOW
Liquid helium management for Gravity Probe-B
[NASA-TM-82521] N83-24830

CAPILLARY TUBES
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811

CARBON
Exploratory study of coal-conversion chemistry
[DE82-020736] N83-24608
Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519

CARBON COMPOUNDS
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020

CARBON CYCLE
Recent changes in the global carbon balance of tropical organic soils
[DE83-006814] N83-25332

CARBON DIOXIDE
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593
Catalysts for alcohols from biomass
[DE83-003611] N83-24630
Carbon Dioxide Effects Research and Assessent Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222
Global Dynamics of Biospheric Carbon. Proceedings of Symposium
[CONF-8108131] N83-25223
Possible storage sites for disposal and environmental control of atmospheric carbon dioxide
[DE83-005993] N83-25229
Increase of total CO sub 2 in the world oceans
[DE83-004868] N83-25235
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515

CARBON DIOXIDE CONCENTRATION
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362

CARBON DIOXIDE LASERS
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers
[AD-A123178] N83-24845
Bonded stacked-ring insulator for the Antares electron gun
[DE82-017586] N83-24851
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853

CARBON FIBERS
Mesophase behavior in carbon fiber bundles
[AD-A123322] N83-24565
Stresses during fabrication of cylindrically woven carbon-carbon composites
[AD-A123153] N83-24567

CARBON MONOXIDE
Catalysts for alcohols from biomass
[DE83-003611] N83-24630

CARBON 14
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593

CARBON-CARBON COMPOSITES
Mesophase behavior in carbon fiber bundles
[AD-A123322] N83-24565

CARBONACEOUS MATERIALS
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix 8 B
[DE82-017047] N83-25181
Laboratory program to support H-coal pilot-plant operations: Volume 2: PDU run 8
[DE82-008213] N83-25187
Energy sources and climate
[DE82-020612] N83-25334

CARBONATES
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927

CARGO
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145

CARRIER MOBILITY
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors
[DE83-004523] N83-25611

CARRIER TRANSPORT (SOLID STATE)
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors
[DE83-004523] N83-25611

CASCADE FLOW
Improved design of subcritical and supercritical cascades using complex characteristics and boundary layer correction
[NASA-CR-168166] N83-24474
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511

CASTING
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027

CASUALTIES
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489

CATALOGS (PUBLICATIONS)
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838

CATALYSIS
Catalytic reduction of nitrogen dioxide
[AD-A123176] N83-24587
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617

CATALYSTS
Liquefaction of bituminous coals with added catalysts
[DE83-000309] N83-24600
Future availability of catalyst metals for synfuel processes
[DE82-015628] N83-24618
Bench-scale development of catalysts for reforming aromatic and heterocyclic hydrocarbons
[DE82-015422] N83-24628
Catalysts for alcohols from biomass
[DE83-003611] N83-24630
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

CATECHOLAMINE
Research efforts
[NASA-CR-171654] N83-25348

CATHODES
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
Applied battery and electrochemical research program
[DE82-020600] N83-25132

CATS
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353

CAUCHY PROBLEM
Two approximations of solutions of Hamilton-Jacobi equations
[AD-A124359] N83-25464

CAUCHY-RIEMANN EQUATIONS
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431

CAVITATION CORROSION
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856

CAVITATION FLOW
Vapor cavitation in dynamically loaded journal bearings
[NASA-TM-83366] N83-24875

CAVITIES
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Natural convection in an enclosed cavity
[NASA-CR-166112] N83-25433

CDC CYBER 170 SERIES COMPUTERS
Bendix CAD-CAM site plan
[DE83-005327] N83-25427

CDC 7600 COMPUTER
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395

CEILINGS (ARCHITECTURE)
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735

CENTAUR LAUNCH VEHICLE
Rolling beam umbilical system N83-24900

CENTRIFUGAL FORCE
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815

CENTRIFUGES
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144

CERAMIC BONDING
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799

CERAMICS
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704

Evaluation of olivine refractories for TES N83-25070
Alternatives to ceramic bricks and ceramic brick systems N83-25071
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Lightweight Zerodur mirror technology [AD-A123538] N83-25555
Structure of large-angle grain boundaries in metals and ceramic oxides [DE82-022006] N83-25608
Experiments in high-voltage electron microscopy [DE83-005283] N83-25612

CEREBRAL CORTEX
Intracortical interactions for orientation contrast [AD-A123326] N83-25353

CEREBROSPINAL FLUID
Research efforts [NASA-CR-171654] N83-25348

CERMETS
Ceramic-metal solid electrolytes [DE82-009034] N83-24591

CHALCOGENIDES
Considerations on the lubrication of spacecraft mechanisms N83-24883
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988

CHARCOAL
Effects of preignition on pulverized-coal combustion [DE82-020517] N83-24599

CHARGE DISTRIBUTION
Electron beam probe for charge neutralization studies of heavy ion beams [LBL-14391] N83-25526

CHARGE EXCHANGE
High-energy-ion depletion in the charge exchange spectrum of Alcator C [DE82-021690] N83-25577

CHARGE TRANSFER
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer [DE82-020067] N83-25509
Collisionally excited few-electron systems: Theoretical introduction and survey [DE82-020805] N83-25516
Optical properties related to electrical switching of Li doped NiO crystals [AD-A124299] N83-25591

CHARGED PARTICLES
A hybrid charged-particle guide for studying (n, charged particle) reactions [DE82-020864] N83-25512
Simulation of plasma double-layer structures [NASA-CR-170270] N83-25563

CHARRING
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76 [DE82-011012] N83-25231

CHECKOUT
Validation diagnostics for defective thermocouple circuits [DE82-012778] N83-24787
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10 [LBL-13405] N83-25394

CHEMICAL ANALYSIS
Catalysts for alcohols from biomass [DE83-003611] N83-24630
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Propellant/material compatibility program and results: Ten-year milestones [NASA-CR-170346] N83-24710
Miniaturized multisensor probes based on coated wire ion selective electrodes [AD-A123415] N83-24837
The Sandia nuclear microprobe [DE83-005363] N83-24839
Unique developments in Laser-Induced Fluorescence Fluorimetry (LIFF) N83-24992
Distribution and analysis of high-purity magnesian limestones in the United States [DE83-901141] N83-25020
Field method for sulfide determination [DE82-017044] N83-25227
Increase of total CO sub 2 in the world oceans [DE83-004868] N83-25235

CHEMICAL BONDS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides [AD-A124298] N83-24581
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis [DE82-021276] N83-24597
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones [DE82-019298] N83-24609
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis [DE82-011870] N83-24622
Development and application of analytical techniques to chemistry of donor solvent liquefaction [DE82-012255] N83-24624

CHEMICAL COMPOSITION
Program WINDOW [DE82-020760] N83-24611
Vitreous enamel damping material development [AD-A124290] N83-24697
Thermodynamic properties of silicate materials N83-24984
Large-block experiments in underground coal gasification N83-25116
Tides in the thermosphere: A review. Environmental research papers [AD-A124314] N83-25252
Mineralogy and chemistry of planets and meteorites [NASA-CR-170345] N83-25637
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States [NASA-CR-170311] N83-25638

CHEMICAL COMPOUNDS
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity [DE82-020758] N83-24612

CHEMICAL ENERGY
Proceedings of the Sixth Annual Thermal and Chemical Storage Contractors' Review Meeting [CONF-810940] N83-25057

CHEMICAL EVOLUTION
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life [NASA-CP-2276] N83-24556

CHEMICAL EXPLOSIONS
Mallet impact test [DE83-001841] N83-24718

CHEMICAL MACHINING
Cutting-fluid conservation [Y-2250] N83-24728

CHEMICAL PROPERTIES
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985
Chemistry of nuclear waste substances in aqueous solutions N83-24986

CHEMICAL PROPULSION
Propellant/material compatibility program and results: Ten-year milestones [NASA-CR-170346] N83-24710

CHEMICAL REACTIONS
CHEMSEN: A computer code for sensitivity analysis of elementary chemical reaction models [DE82-020886] N83-24557
Infrared emission from gas-aerosol reactions [AD-A123365] N83-24578
Uranium from seawater [DE83-000658] N83-24595
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions [DE83-900751] N83-24616
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985
The chemical basis for the origin of the genetic code and the process of protein synthesis [NASA-CR-170334] N83-25344

CHEMICAL REACTORS
Continuous chemical-reaction chromatography [DE82-010447] N83-24594

CHEST
Interaction of anti-G measures and chest wall mechanics in determining gas exchange [AD-A122297] N83-25365

CHILDREN
Longitudinal study of human hearings: Its relationship to noise and other factors. 3: Results from the first five years [AD-A123175] N83-25355

CHIPS (ELECTRONICS)
VLSI implementation of odd-even sorter using a uniform ladder [TR-85] N83-24767
MISE: Machine for In-System Evaluation of custom VLSI chips [AD-A123334] N83-24773
Design and implementation of a single-chip 1-D median filter [AD-A123328] N83-24777
Computational geometry on a systolic chip [AD-A123362] N83-25382

CHLOROCARBONS
Low temperature energy trapping and emission line profile of disordered solids [AD-A123434] N83-25597

CHOLESTEROL
An assessment of the relationship between the coronary-prone (type A) behavior pattern, stress, and coronary heart disease [AD-A122809] N83-25358

CHROMATOGRAPHY
Continuous chemical-reaction chromatography [DE82-010447] N83-24594
Applications of ion chromatography [DE83-004942] N83-24632

CHROMIUM ALLOYS
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
Microstructural development of 20 percent-cold-worked type 316 stainless steel irradiated in ORR at 250 to 500 deg C N83-24657
The ductility behavior of irradiated path alloys N83-24658

CHROMIUM COMPOUNDS
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex [AD-A124302] N83-24583

CHROMIUM STEELS
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
Microstructural development of 20 percent-cold-worked type 316 stainless steel irradiated in ORR at 250 to 500 deg C N83-24657
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Fusion program research materials inventory N83-24670
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671

CHRONOLOGY
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States [NASA-CR-170311] N83-25638

CIRCADIAN RHYTHMS
L-tryptophan: Effects on daytime sleep latency and the waking EEG [AD-A123633] N83-25354

CIRCUIT BOARDS
Capacity selector value electronics enclosure assembly controller card assembly test specifications [AD-A123539] N83-24772

CIRCUITS
A 40 MHz - 2.2 MHz downconverter [INPE-2607-NTE/194] N83-24770
Validation diagnostics for defective thermocouple circuits [DE82-012778] N83-24787
Some error sources in electrical test elements for thin-film solar cells N83-25097
Microwave laboratory computer program library [INPE-2613-NTE/195] N83-25390

CIRCULATION
Heat rejection and energy extraction within solar ponds [DE82-009487] N83-25196

CITIES
Application of remote sensing to urban studies [INPE-2625-NTE/197] N83-25004

CIVIL AVIATION
Alaska Loran-C flight test evaluation [FAA-PM-83-4] N83-24491

CLADDING
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel [DE82-020501] N83-24683
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program [DE82-022078] N83-24736
Near-surface crack detection in nuclear pressure vessels [DE82-019184] N83-24871
Flight systems safety program [DE82-021833] N83-25529

CLASSIFICATIONS
Vegetation and terrain effects on digital clascification of LANDSAT imagery [AD-A124236] N83-25009

CLAYS
Some predictions of the non-homogeneous behaviour of clay in the triaxial test [RR-CE-26] N83-24729

Sorptive diffusion in clay gels N83-24947
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays [TR-1981:49T] N83-25240

CLEAN ENERGY
The characteristics of American coals in relation to their conversion into clean-energy fuels [DE82-017041] N83-25179
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix 8 B [DE82-017047] N83-25181

CLEAN FUELS
The characteristics of American coals in relation to their conversion into clean-energy fuels [DE82-017041] N83-25179
The characteristics of American coals in relation to their conversion into clean-energy fuels [DE82-017040] N83-25180
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix 8 B [DE82-017047] N83-25181

CLEANING
Improved field performance for reverse osmosis systems [AD-A124244] N83-24579

CLEAVAGE
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis [DE82-011870] N83-24622

CLIMATE
Standartized EMCS energy savings calculations [AD-A123383] N83-24731
Summary of requirements and recommendations N83-25270
Guidelines for correction of radiosonde-derived refractive profiles and climatologies [AD-A124351] N83-25322
Energy sources and climate [DE82-020612] N83-25334

CLIMATOLOGY
Estimating a family of distributions with applications to the extension of climatology [AD-A123385] N83-25328
Situation climatic briefs [AD-A123369] N83-25330

CLOCKS
Synchronizing large systolic arrays [AD-A123374] N83-24780

CLOUD COVER
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres [AD-A123396] N83-25257
The estimation of convective precipitation from GOES imagery with the Griffith/Woodley technique N83-25296
Development of an airborne visibility meter [AD-A124276] N83-25327
Weather forecast adjustment using model output cloud fields and digital satellite data [AD-A123702] N83-25329

CLOUD DISPERSAL
A life history method for estimating convective rainfall N83-25293

CLOUDS
Experimental comparison of icing cloud instruments [NASA-TM-83340] N83-24487
Development of an airborne visibility meter [AD-A124276] N83-25327
Weather forecast adjustment using model output cloud fields and digital satellite data [AD-A123702] N83-25329
Machine classification of cloud particle types [AD-A123402] N83-25331
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions [AD-A123388] N83-25467
Remote sensing of the optical and physical densities of smoke, dust, and water clouds [AD-A124321] N83-25556

CLUMPS
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation [DE83-003804] N83-24617

CLUSTER ANALYSIS
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation [NASA-CR-166117] N83-25496

COAL
High-temperature combustion of pulverized coal [DE82-022505] N83-24589
Critical studies of the rapid pyrolysis and hydropyrolysis of coal [DE83-000101] N83-24596
Liquefaction of bituminous coals with added catalysts [DE83-000309] N83-24600
Analytical studies for the H-coal process [DE82-019835] N83-24601
Exploratory study of coal-conversion chemistry [DE82-020736] N83-24608
Development of an efficient coal-desulfurization process: Oxy-alkalinolysis [DE82-016384] N83-24623
Mine ventilation planning: A case study N83-24990
Thermomechanical cavity-growth modeling [DE82-020356] N83-25139
Demonstration of new high-performance batteries in coal-mining scoops [DE82-020535] N83-25145
The characteristics of American coals in relation to their conversion into clean-energy fuels [DE82-017041] N83-25179
The characteristics of American coals in relation to their conversion into clean-energy fuels [DE82-017040] N83-25180
Studies of earth stress and rock properties and the hydraulic-fracturing process [DE82-016779] N83-25259

COAL DERIVED LIQUIDS
Exploratory study of coal-conversion chemistry [DE82-020736] N83-24608

COAL GASIFICATION
Gas characterization from fluidized-bed coal gasification [DE82-021179] N83-24598
Method for initiating an undergound combustion process [DE82-020164] N83-24604
Technical underground-coal-gasification summation: 1982 status [DE82-020160] N83-24605
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics [DE82-905367] N83-24626
Testing and validation of the Purdue Physical Properties Package (PPROP) Code [DE82-007727] N83-24724
Safety issues related to synthetic-fuels facilities [DE82-017671] N83-24739
IGCC performance comparison for variations in gasifier type and gas turbine firing temperature [NASA-TM-83310] N83-25037
Energy and Technology Review [DE83-003802] N83-25115
Large-block experiments in underground coal gasification N83-25116
Thermomechanical cavity-growth modeling [DE82-020356] N83-25139
Assessment of materials and components performance in Bi-Gas, Westinghouse and Combustion Engineering gasification pilot plants [DE82-020457] N83-25140
Advanced coal-gasification system for electric-power generation [DE82-021338] N83-25141
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres [DE82-905772] N83-25182
Central Arkansas Energy Project. Coal to medium-Btu gas [DE82-017577] N83-25184
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2 [DE82-016339] N83-25185
Coal-Gasification Modeling Workshop Proceedings [DE82-017279] N83-25186
Identification of data gaps and research needs for solid wastes from synfuel technologies [DE83-000936] N83-25216
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76 [DE82-011012] N83-25231

COAL LIQUEFACTION
Liquefaction of bituminous coals with added catalysts [DE83-000309] N83-24600
Analytical studies for the H-coal process [DE82-019835] N83-24601
Evaluation of coking behavior in coal-liquefaction-process equipment [DE82-020831] N83-24606
Exploratory study of coal-conversion chemistry [DE82-020736] N83-24608
Future availability of catalyst metals for synfuel processes [DE82-015628] N83-24618
Development and application of analytical techniques to chemistry of donor solvent liquefaction [DE82-012255] N83-24624
SRC-1 coal-liquefaction demonstration plant project baseline assessment report [DE82-013863] N83-24627
Testing and validation of the Purdue Physical Properties Package (PPROP) Code [DE82-007727] N83-24724
Operation of the Wilsonville Advanced Coal-Liquefaction R and D Facility, Wilsonville, Alabama [DE83-000110] N83-25133
Identification of data gaps and research needs for solid wastes from synfuel technologies [DE83-000936] N83-25216

COAL UTILIZATION
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies [DE82-009791] N83-24592
Effects of preignition on pulverized-coal combustion [DE82-020517] N83-24599
Computational tools for pulverized-coal combustion [DE82-021387] N83-24602
Future availability of catalyst metals for synfuel processes [DE82-015628] N83-24618
Development of an efficient coal-desulfurization process: Oxy-alkalinolysis [DE82-016384] N83-24623
Coal/oil thixogel fuels for diesels [DE83-000398] N83-24719
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix 8 B [DE82-017047] N83-25181
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres [DE82-905772] N83-25182
Feasibility of a small central cogenerated energy facility: Energy management memorandum [DE83-005083] N83-25211

COASTAL ECOLOGY
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone [DE83-004912] N83-25230

COASTAL WATER
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone [DE83-004912] N83-25230
Lessening the scope of federal coastal zone management: What's at stake [DE83-004048] N83-25233
A model for on-offshore sediment transport in the surfzone [AD-A124235] N83-25340

COATING
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering --- selective absorber coatings of alumina-metal-alumina [DE83-005692] N83-24687
Chemical deposition of TiO2 layers on GaAs [AD-A124281] N83-25600

COATINGS
Channel plating [DE82-021687] N83-24708

COAXIAL CABLES
Electrically small antennas [AD-A124364] N83-24744

CODING
LENS* 4: A program for calculation of geometric optics of the human eye [DE83-003890] N83-25368
Computer Software Program Plan (CSPP) [TIS-83-SDS-006] N83-25392
What is a Software Engineering Environment (SEE)? Desired characteristics [AD-A124280] N83-25396
Grid-based line drawing quantization [AD-A124692] N83-25405

COEFFICIENT OF FRICTION
Tribological and microstructural characteristics of ion-nitrided steels [NASA-TM-83368] N83-24635
Lubrication with naturally occurring double oxide films [AD-A124248] N83-24698

COEFFICIENTS
Metal-hydride heat-pump performance studies N83-25069
Estimating distributed lag coefficients when there are errors in the observed time series [AD-A123460] N83-25468

COGENERATION
Feasibility of cogenerated district heating and cooling for North Loop project [DE83-005654] N83-25125
Feasibility case study of gas-turbine direct-heat industrial cogeneration [DE83-005655] N83-25126

Evaluation of dual-energy-use systems. Volume 1: Executive summary
[DE83-900758] N83-25198
Evaluation of dual-energy-use systems, volume 2
[DE83-900757] N83-25199
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211

COGNITION
Forms of understanding in mathematical problem solving
[AD-A123384] N83-25454

COGNITIVE PSYCHOLOGY
Simulation systems for cognitive psychology
[AD-A123394] N83-25369

COHERENT ELECTROMAGNETIC RADIATION
Generators of coherent radiation from relativistic electrons
[DE82-020370] N83-25521

COHERENT LIGHT
Coherent conversion of the sunlight spectrum
[NASA-CR-170185] N83-25026

COHERENT RADIATION
Microspectroscopy
[DE82-020158] N83-24614

COKE
Evaluation of coking behavior in coal-liquefaction-process equipment
[DE82-020831] N83-24606
Safety issues related to synthetic-fuels facilities
[DE82-017671] N83-24739

COLD WEATHER
Cold weather aerostat study
[AD-A123407] N83-24484

COLLIMATION
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543

COLLISIONAL PLASMAS
Electron beam probe for charge neutralization studies of heavy ion beams
[LBL-14391] N83-25526

COMBINED CYCLE POWER GENERATION
IGCC performance comparison for variations in gasifier type and gas turbine firing temperature
[NASA-TM-83310] N83-25037

COMBUSTIBLE FLOW
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies
[DE82-009791] N83-24592
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795

COMBUSTION
CARS diagnostics of high pressure combustion
[AD-A124304] N83-24584
Fuels combustion research
[AD-A123118] N83-24586
Laser spectroscopy of combustion intermediates
[DE83-004869] N83-24590
Technical underground-coal-gasification summation: 1982 status
[DE82-020160] N83-24605
Ionic aspects of soot formation
[DE82-020799] N83-24619
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626

COMBUSTION CHAMBERS
A critical review of pulsating combustion
[TAE-468] N83-24576

COMBUSTION CONTROL
Method for initiating an undergound combustion process
[DE82-020164] N83-24604

COMMAND AND CONTROL
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527

COMMERCIAL AIRCRAFT
Ride quality systems for commuter aircraft
[NASA-CR-166118] N83-24512

COMMERCIAL ENERGY
Assessment of cool storage in commercial building applications N83-25073

COMMUNICATION
Mathematical definition of protocol translation
[DE82-015188] N83-25471

COMMUNICATION NETWORKS
ULF near fields in layered media
[AD-A123689] N83-24747

COMMUNITIES
Community energy management: An annotated bibliography
[ANL/CNSV-29] N83-25046

COMPARATOR CIRCUITS
VLSI implementation of odd-even sorter using a uniform ladder
[TR-85] N83-24767

COMPARISON
A comparison of quartz crystals grown from fused silica and from crystalline nutrient
[DE82-019487] N83-25603

COMPATIBILITY
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Hydrogen compatibility of steels N83-25064

COMPILERS
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399

COMPLEX COMPOUNDS
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex
[AD-A124302] N83-24583

COMPLEXITY
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485

COMPONENT RELIABILITY
Assessment of materials and components performance in Bi-Gas, Westinghouse and Combustion Engineering gasification pilot plants
[DE82-020457] N83-25140

COMPONENTS
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192

COMPOSITE MATERIALS
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Flywheel testing and evaluation
[DE82-020894] N83-25160
Flywheel evaluation at ORFEL rotor testing in FY 1982
[DE82-020825] N83-25161
Dynamic behavior of particulate viscoelastic composites for sound absorption
[AD-A124272] N83-25502

COMPOSITE PROPELLANTS
Projectile impact ignition characteristics of propellants
[AD-A122944] N83-24715

COMPOSITE STRUCTURES
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Simulated blast testing of advance interceptor materials
[AD-A124374] N83-24563
Nonlinear transient analysis of layered composite plates
[AD-A123182] N83-24566
Design and fabrication of realistic adhesively bonded joints
[NASA-CR-166099] N83-24876

COMPRESSED AIR
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201

COMPRESSIBILITY
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859

COMPRESSIBILITY EFFECTS
The design of single angle struts
[RR-CE-19] N83-24877

COMPRESSIBLE FLUIDS
Initial boundary value problems for the equations of motion of compressible viscous and heat-conductive fluids
[AD-A124382] N83-25440

COMPRESSION LOADS
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855

COMPRESSORS
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511

COMPUTATION
Modeling heat transfer in PCM's with the Budak method N83-25077
On the complexity of designing distributed protocols
[AD-A123300] N83-25401
Some remarks on the Herlestam-Johannesson algorithm for computing logarithms over GF(2P)
[DE82-020628] N83-25423
A study in parallel computation: The traveling salesman problem
[AD-A123327] N83-25455

COMPUTATIONAL FLUID DYNAMICS
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
Calculation of transonic potential flow around a wing-body-tail combination
[AD-A124247] N83-24482
Adaptive grid generation using elliptic generating equations with precise coordinate controls
[AD-A123181] N83-25457

COMPUTATIONAL GRIDS
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
Transformation of two and three-dimensional regions by elliptic systems
[NASA-CR-170310] N83-25430
Adaptive grid generation using elliptic generating equations with precise coordinate controls
[AD-A123181] N83-25457

COMPUTER AIDED DESIGN
Improved design of subcritical and supercritical cascades using complex characteristics and boundary layer correction
[NASA-CR-168166] N83-24474
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide
[NASA-CR-166063] N83-24544
The user-assisted automated experimental (TEST) design program (AED): Version 2
[AD-A124303] N83-25400
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4
[AD-A123307] N83-25406
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1
[AD-A123304] N83-25407
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2
[AD-A123305] N83-25408
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3
[AD-A123306] N83-25409
Bendix CAD-CAM site plan
[DE83-005327] N83-25427
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548

COMPUTER AIDED MANUFACTURING
CAM highlights, FY 82
[AD-A123395] N83-25417

COMPUTER DESIGN
Massively parallel processor computer
[NASA-CASE-GSC-12223-1] N83-25378
Computational geometry on a systolic chip
[AD-A123362] N83-25382
Interface specifications for the SCR (A-7E) extended computer module
[AD-A123566] N83-25411

COMPUTER GRAPHICS
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368

Text string plotting enhancements for the Tektronix advanced graphing 2 software on the ORNL Fusion Energy Division decsystem-10
[ORNL/TM-8026] N83-25387
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395
Experiences with distributing graphic software between processors
[DE82-019559] N83-25424
Bendix CAD-CAM site plan
[DE83-005327] N83-25427
Hidden line elimination in projected grid surfaces
[AD-A124348] N83-25447
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493

COMPUTER INFORMATION SECURITY
The impact of security controls on computing productivity
[LA-9214-MS] N83-25380
Computer Software Program Plan (CSPP)
[TIS-83-SDS-006] N83-25392
A methodology for assessing the security risks associated with computer sites and networks. Part 1: Development of a formal questionnaire for collecting security information
[UCRL-53292-PT-1] N83-25428

COMPUTER NETWORKS
The impact of security controls on computing productivity
[LA-9214-MS] N83-25380
File migration in distributed computer systems
[DE82-021572] N83-25383
Experiences with distributing graphic software between processors
[DE82-019559] N83-25424
A methodology for assessing the security risks associated with computer sites and networks. Part 1: Development of a formal questionnaire for collecting security information
[UCRL-53292-PT-1] N83-25428
Minimization of path lengths in single stage connection networks
[DE82-020174] N83-25429
Mathematical definition of protocol translation
[DE82-015188] N83-25471

COMPUTER PROGRAM INTEGRITY
What is a Software Engineering Environment (SEE)? Desired characteristics
[AD-A124280] N83-25396
A methodology for assessing the security risks associated with computer sites and networks. Part 1: Development of a formal questionnaire for collecting security information
[UCRL-53292-PT-1] N83-25428

COMPUTER PROGRAMMING
A language-oriented interactive programming environment based on compilation technology
[AD-A123347] N83-25398
Interface specifications for the SCR (A-7E) extended computer module
[AD-A123566] N83-25411
A system for developing HP41CV hand-held calculator programs on an HP9845 desktop computer
[DE83-005360] N83-25426
SLATEC common mathematical library source file format
[DE83-005812] N83-25619

COMPUTER PROGRAMS
CHEMSEN: A computer code for sensitivity analysis of elementary chemical reaction models
[DE82-020886] N83-24557
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE82-012255] N83-24624
Testing and validation of the Purdue Physical Properties Package (PPROP) Code
[DE82-007727] N83-24724
Hinge latch mechanism N83-24904
Uranium (VI) retardation mechanisms N83-24946
Temporal image normalization
[AD-A123313] N83-25010
Alternatives to ceramic bricks and ceramic brick systems N83-25071
Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146
Advanced wellbore thermal simulator GEOTEMP2 research report
[DE82-020050] N83-25154
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159
Coal-Gasification Modeling Workshop Proceedings
[DE82-017279] N83-25186
Evaluation of dual-energy-use systems, volume 2
[DE83-900757] N83-25199
SLR-PLUS version 1.0 user's manual
[DE83-004109] N83-25204
Atmospheric transport and dispersion model: User's manual
[AD-A123352] N83-25324
Data acquisition and analysis software for thermal stress studies
[AD-A122567] N83-25361
Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386
Microwave laboratory computer program library
[INPE-2613-NTE/195] N83-25390
Computer Software Program Plan (CSPP)
[TIS-83-SDS-006] N83-25392
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394
What is a Software Engineering Environment (SEE)? Desired characteristics
[AD-A124280] N83-25396
A FORTRAN program for isotonic regression in two independent variables
[AD-A123510] N83-25397
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
Jovial program verifier rugged Jovial environment
[AD-A123681] N83-25402
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403
A VAX assembler for the Intel 8748 microcomputer
[AD-A123378] N83-25404
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4
[AD-A123307] N83-25406
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1
[AD-A123304] N83-25407
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2
[AD-A123305] N83-25408
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3
[AD-A123306] N83-25409
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions
[AD-A123406] N83-25413
Software reliability modelling and estimation techniques
[AD-A123421] N83-25414
Report of the Department of Defense Joint Service Task Force on software problems
[AD-A123449] N83-25416
ABAQUS-EPGEN: A general-purpose finite-element code. Volume 1: User's manual
[DE83-900754] N83-25418
PLUNGE: A computer program for transient-event analysis
[DE82-902098] N83-25419
SUBMAP manual: Subroutine mapping program
[DE82-021836] N83-25420
Software for estimating sparse Jacobian matrices
[DE82-021234] N83-25421
Computational methods and software for ODES and their applications
[DE82-020803] N83-25422
Experiences with distributing graphic software between processors
[DE82-019559] N83-25424
A methodology for assessing the security risks associated with computer sites and networks. Part 1: Development of a formal questionnaire for collecting security information
[UCRL-53292-PT-1] N83-25428
A method for interpolating in Bondarenko factor tables and other functions
[DE82-015685] N83-25470
A FORTRAN program for the level probabilities of order restricted inference
[AD-A123511] N83-25477
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577

COMPUTER STORAGE DEVICES
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039

COMPUTER SYSTEMS DESIGN
Large scale software system design of the missile minder AN/TSQ-73 using the Ada programming language
[AD-A123308] N83-25410
Minimization of path lengths in single stage connection networks
[DE82-020174] N83-25429

COMPUTER SYSTEMS PROGRAMS
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519
Large scale software system design of the missile minder AN/TSQ-73 using the Ada programming language
[AD-A123308] N83-25410

COMPUTER TECHNIQUES
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements — Kansas and Indiana
[E83-10293] N83-24996
A study of dynamic energy equations for Stirling cycle analysis
[NASA-CR-168152] N83-25043
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362
Cumulative reports and publications thru 31 December 1982
[NASA-CR-166116] N83-25377
Report of the Department of Defense Joint Service Task Force on software problems
[AD-A123449] N83-25416
Magnetic fusion energy and computers
[DE82-020165] N83-25573

COMPUTER VISION
On shapes
[TR-92] N83-25388

COMPUTERIZED SIMULATION
Calculation of unsteady transonic potential flow over 3-dimensional wings with oscillating control surfaces
[NAL-TR-746] N83-24477
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540
Standarized EMCS energy savings calculations
[AD-A123383] N83-24731
Electric-hybrid-vehicle simulation
[DE82-020838] N83-24791
Computer modeling of heat pipe performance
[NASA-CR-171641] N83-24806
Adiabatic deformation and strain localization
[AD-A123695] N83-24818
Generic studies of geothermal reservoir behavior N83-24970
Simulation of thermal energy storage in a doublet well system N83-24973
Mathematical modeling of TES subsystems N83-25079
Advanced wellbore thermal simulator GEOTEMP2 research report
[DE82-020050] N83-25154
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265
Basic techniques in environmental simulation
[AD-A123342] N83-25325
Simulation systems for cognitive psychology
[AD-A123394] N83-25369
Superefficient simulation of Markov chains and semi-Markov processes
[AD-A124252] N83-25480
Magnetic fusion energy and computers
[DE82-020165] N83-25573
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583

COMPUTERS
Machine classification of cloud particle types
[AD-A123402] N83-25331

CONCENTRATION (COMPOSITION)
Field method for sulfide determination
[DE82-017044] N83-25227

CONCRETES
Methyl methacylate polymer-concrete for bomb damage repair
[AD-A123346] N83-24899
Annotated bibliography: Polymers in concrete
[AD-A123414] N83-24702
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732
CONDENSERS
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988
CONDENSERS (LIQUEFIERS)
Development of a condenser for the dual catalyst water recovery system
[NASA-CR-166478] N83-25372
CONDUCTION BANDS
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594
CONDUCTIVE HEAT TRANSFER
Some aspects of the computer simulation of conduction heat transfer and phase change processes
[ORNL/CSD-100] N83-24801
COYOTE: A finite-element computer program for nonlinear heat-conduction problems
[DE83-003822] N83-24820
Coupled convective and conductive heat transfer by up-wind finite element method
[DE82-904594] N83-24826
Thermal conductivity of molten alkali nitrates N83-25084
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087
CONFERENCES
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
Summer Study Program in Geophysical Fluid Dynamics: Particle Motions in Fluids
[AD-A122864] N83-24932
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
Proceedings of the Sixth Annual Thermal and Chemical Storage Contractors' Review Meeting
[CONF-810940] N83-25057
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Coal-Gasification Modeling Workshop Proceedings
[DE82-017279] N83-25186
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192
Global Dynamics of Biospheric Carbon. Proceedings of Symposium
[CONF-8108131] N83-25223
The Stiffness of Joints
[TULEA-1981:22] N83-25241
CONGRESSIONAL REPORTS
Report to the Congress: Regional petroleum reserves
[DE83-005270] N83-25124
San Francisco's wastewater treatment program needs reexamination and better management
[GAO/MASAD-83-11] N83-25220
National Aeronautics and Space Administration Authorization Act, 1983 N83-25622
National Aeronautics and Space Administration Authorization Act, 1983 N83-25623
Analysis of the comprehensive energy emergency response procedures report
[GAO/RCED-83-106] N83-25624
CONIFERS
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho
[E83-10289] N83-25024
CONJUGATION
Research efforts
[NASA-CR-171654] N83-25348
CONSERVATION EQUATIONS
Continuum modeling of two-phase flows
[AD-A124385] N83-24812
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225
CONSTANTS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
CONSTRAINTS
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
CONSTRUCTION
Heat-pump cool storage in a clathrate of freon
[DE82-020840] N83-25158
CONTACT LENSES
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368
CONTAINERLESS MELTS
Gas levitator having fixed levitation node for containerless processing
[NASA-CASE-MFS-25509-1] N83-24828
CONTAINMENT
Operation of the ORR spectral tailoring experiments ORR-MFE-4A and ORR-MFE-4B N83-24650
Flywheel testing and evaluation
[DE82-020894] N83-25160
CONTAMINANTS
Experimental design of an interlaboratory study for trace metal analysis of liquid fluids --- for aerospace vehicles
[NASA-TP-2148] N83-24575
CONTINENTAL SHELVES
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Geologic setting of the Georges Bank Basin N83-24923
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Thermal history of the Georges Bank Basin N83-24929
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931
CONTINUITY
Continuous chemical-reaction chromatography
[DE82-010447] N83-24594
CONTINUOUS RADIATION
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target
[AD-A124323] N83-24755
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24781
CONTINUOUS SPECTRA
Extended near infrared emission from visual reflection nebulae
[NASA-TM-85315] N83-25629
CONTINUUM FLOW
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
CONTOURS
Perfect bell nozzle parametric and optimization curves
[NASA-RP-1104] N83-24549
CONTROL EQUIPMENT
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
Tethered satellite control mechanism N83-24882
CONTROL RODS
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684
CONTROL THEORY
Stochastic differential game techniques
[AD-A124634] N83-25487
The restricted Stackelberg problem
[AD-A124638] N83-25488
Minimax robustness in communication and control --- minimax robustness in communication and control
[AD-A124639] N83-25489
CONTROLLED FUSION
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment --- controlled fusion
[CEA-R-5153] N83-25562
Magnetic fusion energy and computers
[DE82-020165] N83-25573
Thermal-barrier trapping current in a tandem mirror
[DE82-021695] N83-25579
CONVECTION
Experimental and numerical studies of natural convection in a Hele-Shaw cell
[DE83-005251] N83-24824
Verification and improvement of a predictive model for radionuclide migration N83-24944
Natural convection in an enclosed cavity
[NASA-CR-166112] N83-25433
CONVECTION CLOUDS
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295
CONVECTIVE FLOW
Experimental and numerical studies of natural convection in a Hele-Shaw cell
[DE83-005251] N83-24824
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641
CONVECTIVE HEAT TRANSFER
The bidimensional Stefan problem with convection: The time-dependent case
[AD-A124377] N83-24810
Coupled convective and conductive heat transfer by up-wind finite element method
[DE82-904594] N83-24826
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Severe storms requirements for precipitation information N83-25281
CONVERGENCE
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431
N-width and entropy of H(p)-classes in L(g) (-1,1)
[AD-A124346] N83-25445
Convergence rates for multivariate smoothing spline functions
[AD-A124368] N83-25452
COOLING
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988
Metal-hydride heat-pump performance studies N83-25069
Pelletization and roll encapsulation of phase change materials N83-25074
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Daylight and daylighting laboratory at the Solar Energy Research Institute
[DE82-019255] N83-25135
Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156
Earth thermal-storage-assisted heat pump
[DE82-020823] N83-25157
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159
COOLING SYSTEMS
Standarized EMCS energy savings calculations
[AD-A123383] N83-24731
Assessment of cool storage in commercial building applications N83-25073
Design evaluation of an improved indirect evaporative cooling system
[DE83-900876] N83-25213
COORDINATE TRANSFORMATIONS
Transformation of two and three-dimensional regions by elliptic systems
[NASA-CR-170310] N83-25430
COORDINATES
Grid-based line drawing quantization
[AD-A124892] N83-25405
Adaptive grid generation using elliptic generating equations with precise coordinate controls
[AD-A123181] N83-25457

COPPER
Channel plating
[DE82-021687] N83-24788
Recovery of hydrogen from hydrogen sulfide N83-25066

COPPER ALLOYS
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856

COPPER COMPOUNDS
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633

COPPER SULFIDES
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191

CORE SAMPLING
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924

CORNEA
Ocular thermal injury from intense light
[AD-A122226] N83-25366
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368

CORNER FLOW
Development of the flow field in streamwise corners at hypersonic speeds and effects of the corner flow on downstream fitted flaps
[ESA-TT-583] N83-24480

CORONAGRAPHS
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646

CORRELATION COEFFICIENTS
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287

CORROSION
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647
Environmental effects on properties of structural alloys N83-24672
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
Compatibility studies of structural alloys with solid breeder N83-24674
Design of a diesel exhaust-gas purification system for inert-gas drilling
[DE82-017071] N83-24866
Structural vibration damper for corrosive or high-temperature gaseous environments
[CEGB-TDB-379] N83-24908
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres
[DE82-905772] N83-25182

CORROSION PREVENTION
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675

CORROSION RESISTANCE
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Propellant/material compatibility program and results: Ten-year milestones
[NASA-CR-170346] N83-24710

COSMIC RAYS
Maximum entropy spectral analysis of geomagnetic disturbance indices
[INPE-1693-RPE/120] N83-25242
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon
[NASA-TM-84636] N83-25525
Research in particles and fields
[NASA-CR-170335] N83-25634

COST ANALYSIS
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
Supply curves of conserved energy
[DE82-020066] N83-25188

COST EFFECTIVENESS
Chemical heat pump cost effectiveness evaluation N83-25067
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080
Low-cost process-heat recovery
[DE82-016652] N83-25136
Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146

COST ESTIMATES
Cost of phosphate removal in municipal wastewater treatment plants
[NASA-TM-77060] N83-24573
Mine ventilation planning: A case study N83-24990
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201
Lightweight Zerodur mirror technology
[AD-A123538] N83-25555

COST REDUCTION
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727
Standarized EMCS energy savings calculations
[AD-A123383] N83-24731
Silicon crystal growth in vacuum N83-25031
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083

COTTON
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726

COUPLING
Saturation of the lower-hybrid-drift instability by mode coupling
[AD-A123569] N83-25564
Theory and simulation of laser plasma coupling, 2
[DE82-020350] N83-25580

COVARIANCE
Asymptotic spectral analysis of cross-product matrices
[AD-A123438] N83-25465

CRACK INITIATION
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914

CRACK PROPAGATION
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914
Energy-release rate associated with diffusional crack growth
[DE83-005564] N83-24915
Hydrogen compatibility of steels N83-25064

CRACK TIPS
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910

CRACKING (FRACTURING)
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
Centerline cracking in electron-beam cap-to-header welds in type 304L stainless steel
[DE82-020858] N83-24689
Near-surface crack detection in nuclear pressure vessels
[DE82-019184] N83-24871
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending
[NASA-TM-83059] N83-24874
Case history of tantalum-weld cracking
[DE82-020358] N83-24917
Photovoltaic measurement equipment needs. View of a supplier N83-25095
Flight systems safety program
[DE82-021833] N83-25529

CRACKS
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609

CRASHWORTHINESS
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489

CRAY COMPUTERS
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395

CREEP ANALYSIS
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609

CREEP PROPERTIES
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799

CREEP RUPTURE STRENGTH
Mechanical property evaluations of path C vanadium scoping alloys N83-24659

CRITERIA
Latch fittings for the scientific instruments on the space telescope N83-24898
Pilot selection criteria for the AH-64 helicopter
[AD-A122495] N83-25371

CRITICAL VELOCITY
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507

CROSS COUPLING
A random vibration control system for testing a single test item with multiple inputs
[DE82-018973] N83-24916

CROSSLINKING
Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-021276] N83-24597

CRUDE OIL
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
Recovery of hydrogen from hydrogen sulfide N83-25066
Report to the Congress: Regional petroleum reserves
[DE83-005270] N83-25124

CRYOGENIC COOLING
Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24888

CRYOGENIC WIND TUNNELS
Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models
[N/FE123/S/PUB/77] N83-24517
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
Control of large thermal distortions in a cryogenic wind tunnel N83-24889

CRYOGENICS
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Design and fabrication of conventional and unconventional superconductors
[NASA-CR-170753] N83-24765
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798

CRYSTAL DEFECTS
Energy transfer mechanism switching in disordered solids
[AD-A123448] N83-25598
Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610

CRYSTAL GROWTH
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027
Silicon crystal growth in vacuum N83-25031
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
Crystal growth in substrate-confined liquids
[AD-A123386] N83-25599

A comparison of quartz crystals grown from fused silica and from crystalline nutrient
[DE82-019487] N83-25603

CRYSTAL LATTICES
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645
Measurement of residual stress using the temperature dependence of ultrasonic velocity
[AD-A123694] N83-25593
Structure of Surfaces of Interfaces
[DE82-019302] N83-25606

CRYSTAL STRUCTURE
The tensile properties of unirradiated path A PCA N83-24655
The ductility behavior of irradiated path alloys N83-24658
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
Crystalline to amorphous transformation in silicon
[DE83-003713] N83-25601
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609

CRYSTALLINITY
Crystallinity as a selection criterion for engineering properties of high-density polyethylene
[DE82-020496] N83-24706

CRYSTALLIZATION
Vitreous enamel damping material development
[AD-A124290] N83-24697

CUBIC LATTICES
Stabilized lanthanum sulphur compounds --- thermoelectric materials
[NASA-CASE-NPO-16135-1] N83-24572

CURING
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
Understanding dielectric cure monitoring
[AD-A123507] N83-24834

CURRENT DENSITY
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853
Energy scaling laws for the racetrack induction accelerator
[AD-A123659] N83-25507

CURRENT REGULATORS
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842

CURRENT SHEETS
Fine-scale structure of the Jovian magnetotail current sheet
[NASA-TM-85014] N83-25639
The structure of the heliospheric current sheet, 1978 - 1982
[NASA-CR-170307] N83-25645

CURVATURE
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811

CUTTING
Cutting-fluid conservation
[Y-2250] N83-24728
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732
Cutting-fluid conservation
[DE82-009655] N83-24734

CYCLIC ACCELERATORS
Energy scaling laws for the racetrack induction accelerator
[AD-A123659] N83-25507

CYCLIC COMPOUNDS
Analytical studies for the H-coal process
[DE82-019835] N83-24601

CYCLONES
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280

CYCLOTRON FREQUENCY
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566

CYCLOTRON RESONANCE
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566

CYCLOTRON RESONANCE DEVICES
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles
[NASA-CR-170338] N83-25505

CYLINDRICAL BODIES
Stresses during fabrication of cylindrically woven carbon-carbon composites
[AD-A123153] N83-24567
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811

D

DAMAGE
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading
[DE83-005706] N83-24569
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029

DAMAGE ASSESSMENT
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698

DAMPING
Modular design attitude control system
[NASA-CR-170736] N83-24541

DAMS
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804

DATA ACQUISITION
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE82-012255] N83-24624
Wind-turbine-performance assessment
[DE82-905281] N83-25152
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159
Data acquisition and analysis software for thermal stress studies
[AD-A122567] N83-25361
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546

DATA BASE MANAGEMENT SYSTEMS
Coal-Gasification Modeling Workshop Proceedings
[DE82-017279] N83-25186
Bendix CAD-CAM site plan
[DE83-005327] N83-25427
Reducing the size of a data base by using pattern-recognition techniques
[DE82-017388] N83-25618

DATA BASES
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017041] N83-25179
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters
[DE83-005711] N83-25224
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Ground truth for oceanic rainfall N83-25291
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2
[AD-A123305] N83-25408
PLUNGE: A computer program for transient-event analysis
[DE82-902098] N83-25419
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

DATA LINKS
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
Instrumentation and data acquisition for satellite testing in nuclear environments
[AD-A123560] N83-25554

DATA MANAGEMENT
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1
[AD-A123304] N83-25407
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617

DATA PROCESSING
Detection of arcing faults on distribution feeders
[DE83-900993] N83-24786
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958
The application of ASP: An automated seismic processor N83-24963
LANDSAT-4 image data quality analysis for energy related applications --- nuclear power plant sites
[E83-10295] N83-24996
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite
[AD-A124291] N83-25245
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263
Data acquisition and analysis software for thermal stress studies
[AD-A122567] N83-25361
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379
Data analysis using multiple filters
[DE82-021948] N83-25425
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462

DATA PROCESSING EQUIPMENT
MISE: Machine for In-System Evaluation of custom VLSI chips
[AD-A123334] N83-24773

DATA RECORDING
Historical perspective of mass storage
[DE82-018376] N83-25616

DATA REDUCTION
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379

DATA SAMPLING
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
Reducing the size of a data base by using pattern-recognition techniques
[DE82-017388] N83-25618

DATA STORAGE
Floppy-disk system for punched-tape reader emulation
[DE82-021126] N83-25385
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
Historical perspective of mass storage
[DE82-018376] N83-25616

DATA STRUCTURES
VLSI implementation of odd-even sorter using a uniform ladder
[TR-85] N83-24767

DATA SYSTEMS
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742

DAYGLOW
Predicting energy savings attributed to daylighting
[DE82-022038] N83-25134
Daylight and daylighting laboratory at the Solar Energy Research Institute
[DE82-019255] N83-25135

DEACTIVATION
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825

DEBRIS
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864

DECAY RATES
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950

DECISION MAKING
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
The perception of objects and their functional uses
[AD-A122797] N83-25370
Man-machine cooperation for action planning
[AD-A124243] N83-25373
On the complexity of designing distributed protocols
[AD-A123300] N83-25401
A value-assessment aid to complex decision making
[DE82-905815] N83-25490
A decision making model for the recovery of useful material resources from wastes
[DE82-019204] N83-25620

DECODERS
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394

DECOMPOSITION
How to divide a polygon fairly
[AD-A123335] N83-25451
LU decompositions of generalized diagonally dominant matrices
[ORNL/CSD-98] N83-25491
DECONTAMINATION
Ultrafiltration/reverse osmosis (liquid treatment systems)
[DE82-020775] N83-24607
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823
DEEP WELL INJECTION (WASTES)
Disposal of liquid radioactive wastes through wells or shafts
[DE82-008944] N83-25534
DEFORMATION
Impact damage of composite plates
[NASA-CR-170309] N83-24558
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading
[DE83-005706] N83-24569
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
Adiabatic deformation and strain localization
[AD-A123695] N83-24818
Advances and trends in plate buckling research
[AD-A123358] N83-24909
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609
DEFROSTING
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation
[DE83-005168] N83-24827
DEGREES OF FREEDOM
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403
DEHYDRATION
Continuous chemical-reaction chromatography
[DE82-010447] N83-24594
DELAMINATING
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading
[DE83-005706] N83-24569
DELAWARE BAY (US)
HHE/LORAN-C surveying
[AD-A124343] N83-24498
DEMAND (ECONOMICS)
Geothermal development plan: Yuma County
[DE83-004882] N83-25208
DEMOGRAPHY
Application of remote sensing to urban studies
[INPE-2625-NTE/197] N83-25004
DENITROGENATION
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
DENSITY (MASS/VOLUME)
Crystallinity as a selection criterion for engineering properties of high-density polyethylene
[DE82-020496] N83-24706
DEPLOYMENT
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
Space telescope: Solar array primary deployment mechanism N83-24884
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901
Hinge latch mechanism N83-24904
The evolution fo a release-engage mechanism for use on the orbiter N83-24905
DEPOSITION
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
Formation of silicon nitride structures by direct electron-beam writing
[AD-A124344] N83-25588
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600
DEPTH
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature — central Russian steppes, and high plains of Montana, North Dakota, and Canada
[E83-10297] N83-25000
DESALINIZATION
Desalting seawater and brackish waters: 1981 cost update
[DE82-020482] N83-24629
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
Dickinson geothermal study
[DE82-016945] N83-25018
DESIGN
Latch fittings for the scientific instruments on the space telescope N83-24898
DESIGN ANALYSIS
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
Design and fabrication of conventional and unconventional superconductors
[NASA-CR-170753] N83-24765
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853
Two hundred passage three-way valve: Fraction collector N83-24894
The manned maneuvering unit flight controller arm N83-24897
Metal-hydride heat-pump performance studies N83-25069
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25128
Initial detailed designs for intermediate photovoltaic systems: Office building
[DE83-005365] N83-25172
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
The user-assisted automated experimental (TEST) design program (AED): Version 2
[AD-A124303] N83-25400
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585
DESORPTION
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
DESTABILIZATION
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
DESULFURIZING
Development of an efficient coal-desulfurization process: Oxy-alkalinolysis
[DE82-016384] N83-24623
Recovery of hydrogen from hydrogen sulfide N83-25066
DETECTION
The Regional Seismic Test Network N83-25117
Development of translational image registration techniques
[INPE-2634-RPE-427] N83-25389
Simulation analysis of some outlier detection methods
[ORNL/CSO/TM-143] N83-25434
DETONATION
Mallet impact test
[DE83-001841] N83-24718
Large scale hydrogen-air detonations
[DE82-020353] N83-24722
DEUTERONS
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon
[NASA-TM-84636] N83-25525
DIAGNOSIS
Precipitation measurement requirements for general circulation climate model development and applications N83-25277
DIAMETERS
Diameters of O type stars based on ultraviolet observations
[INPE-2692-PRE/290] N83-25632
DIATOMIC MOLECULES
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
DIBUTYL COMPOUNDS
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
DIELECTRIC PROPERTIES
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Orientation of ceramic microstructures by hot-forming methods
[DE83-005232] N83-24707
Quasi-optic studies of dielectric radomes and lenses
[AD-A124371] N83-24761
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
DIELECTRICS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
Analysis of the suspended H-waveguide and other related dielectric waveguide structures
[AD-A124342] N83-24757
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766
DIESEL ENGINES
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211
DIESEL FUELS
Coal/oil thixogel fuels for diesels
[DE83-000398] N83-24719
Alcohol/petroleum systems as fuels for diesel engines
[DE82-020752] N83-24721
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726
DIFFERENCES
Software for estimating sparse Jacobian matrices
[DE82-021234] N83-25421
DIFFERENTIAL EQUATIONS
Computational methods and software for ODES and their applications
[DE82-020803] N83-25422
A nonlinear volterra integrodifferential equation occurring in heat flow
[AD-A124349] N83-25448
the effect of changing step size on the accuracy of multistep formulas
[DE82-020884] N83-25474
Singular differential game numerical technique and closed loop guidance and control strategies
[AD-A124625] N83-25484
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
Stochastic differential game techniques
[AD-A124634] N83-25487
DIFFERENTIAL THERMAL ANALYSIS
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548
DIFFUSION
Experimental investigation of high performance, short, thrust augmenting ejectors — V/STOL aircraft
[AD-A125529] N83-24809
Energy-release rate associated with diffusional crack growth
[DE83-005564] N83-24915
Verification and improvement of a predictive model for radionuclide migration N83-24944
Sorptive diffusion in clay gels N83-24947
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Diffusion length measurement and silicon quality N83-25098

Developments toward an 18% efficient silicon solar cell
[NASA-CR-168141] N83-25112
A diffusion equation with a nonmonotone constitutive function
[AD-A124345] N83-25444
DIFFUSION FLAMES
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies
[DE82-009791] N83-24592
DIGITAL COMPUTERS
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
DIGITAL DATA
Vegetation and terrain effects on digital classification of LANDSAT imagery
[AD-A124236] N83-25009
Weather forecast adjustment using model output cloud fields and digital satellite data
[AD-A123702] N83-25329
DIGITAL SYSTEMS
Integrated assurance assessment of a reconfigurable digital flight control system
[NASA-CR-170281] N83-24515
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519
Conversion of existing continuous control systems into digital control systems
[AD-A123167] N83-24783
Temporal image normalization
[AD-A123313] N83-25010
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
DIGITAL TECHNIQUES
Digital ultrasonic signal processing techniques used for the clarification of ultrasonic signals
[DE82-019244] N83-25504
DIGITAL TO ANALOG CONVERTERS
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
DIMERS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
DIPHENYL COMPOUNDS
Exploratory study of coal-conversion chemistry
[DE82-020736] N83-24608
DIPOLE MOMENTS
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583
DIPOLES
Electrically small antennas
[AD-A124364] N83-24744
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
DIRECT CURRENT
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers
[AD-A123178] N83-24845
DIRECT POWER GENERATORS
Spectral response measurements for solar cells N83-25110
Advanced-fuel-cell development
[DE82-021272] N83-25136
DIRECTIONAL CONTROL
Experimental investigation of high performance, short, thrust augmenting ejectors --- V/STOL aircraft
[AD-A125529] N83-24809
DISCRETE FUNCTIONS
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
DISCRIMINATION
Seismic discrimination
[AD-A124322] N83-25254
DISKS (SHAPES)
Steam-turbine-disc cracking experience. Volume 2: Data summaries and discussion
[DE82-905834] N83-24918
DISPERSIONS
Ascent trajectory dispersion analysis
[NASA-CR-170741] N83-24529
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225
Atmospheric transport and dispersion model: User's manual
[AD-A123352] N83-25324
DISPLACEMENT
Consolidation of axi-symmetric bodies subjected to non axi-symmetric loading
[RR-CE-20] N83-24879
DISPLACEMENT MEASUREMENT
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending
[NASA-TM-83059] N83-24874
DISPLAY DEVICES
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
A digital image processor as a human factors engineering tool
[DE82-015173] N83-25376
Bendix CAD-CAM site plan
[DE83-005327] N83-25427
DISSIPATION
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
DISTANCE MEASURING EQUIPMENT
Rotary target v-block --- wind tunnel apparatus
[NASA-CASE-LAR-12007-3] N83-25542
DISTILLATION
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-019722] N83-24621
Desalting seawater and brackish waters: 1981 cost update
[DE82-020482] N83-24629
DISTORTION
Visual judgments of optical distortions in aircraft windscreens
[AD-A124307] N83-24503
DISTRIBUTED PROCESSING
File migration in distributed computer systems
[DE82-021572] N83-25383
On the complexity of designing distributed protocols
[AD-A123300] N83-25401
Experiences with distributing graphic software between processors
[DE82-019559] N83-25424
DISTRIBUTION FUNCTIONS
Vector wind profile gust model
[NASA-CR-170762] N83-25320
Estimating a family of distributions with applications to the extension of climatology
[AD-A123385] N83-25328
DIURNAL VARIATIONS
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
Global weather requirements for precipitation measurements N83-25282
Guidelines for correction of radiosonde-derived refractive profiles and climatologies
[AD-A124351] N83-25322
The solar radiation field at twilight below 100 KM: A spherical model
[AD-A122832] N83-25648
DOCUMENTATION
Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3
[AD-A123306] N83-25409
DOCUMENTS
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
DONOR MATERIALS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
DOPPLER EFFECT
Polar motion prediction analysis
[AD-A124198] N83-25250
Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25589
DOPPLER RADAR
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target
[AD-A124323] N83-24755
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265
Use of combined radar and radiometer systems in space for precipitation measurement: Some ideas N83-25312
DRAG
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force)
[NAL-TR-751] N83-24475
Atmospheric drag effects on the motion of an artificial Earth satellite
[NAL-TR-748] N83-24534
DRAG MEASUREMENT
Atmospheric drag effects on the motion of an artificial Earth satellite
[NAL-TR-748] N83-24534
DRAG REDUCTION
An experimental and theoretical investigation of the reduction in parachute drag caused by forebody wake effects: Data compilation and program summary
[DE83-005364] N83-24486
DRAINAGE
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California
[NASA-TM-84317] N83-25003
DRAINAGE PATTERNS
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
DRILLING
Design of a diesel exhaust-gas purification system for inert-gas drilling
[DE82-017071] N83-24866
DROP
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813
DROP SIZE
Experimental comparison of icing cloud instruments
[NASA-TM-83340] N83-24487
The differential reflectivity dual polarization method of rainfall measurements N83-25289
DROP TESTS
Analysis of long bone and vertebral failure patterns
[AD-A123163] N83-25356
DROPS (LIQUIDS)
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge
[AD-A123670] N83-24776
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25467
Behavior of nuclei at high angular momentum
[DE82-020267] N83-25514
DUCTILITY
The tensile properties of unirradiated path A PCA N83-24655
The ductility behavior of irradiated path alloys N83-24658
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields
[DE82-904603] N83-24690
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914
Flight systems safety program
[DE82-021833] N83-25529
DUCTS
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine
[NASA-TM-83359] N83-24505
DURABILITY
Seal performance and durability of rotating shaft seals of liquid oxygen turbopump
[NAL-TR-717] N83-24860
DUST
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556

DYE LASERS
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848
DYNAMIC CHARACTERISTICS
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559
DYNAMIC LOADS
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867
Vapor cavitation in dynamically loaded journal bearings
[NASA-TM-83366] N83-24875
DYNAMIC STABILITY
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798
DYNAMIC STRUCTURAL ANALYSIS
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 1: Executive summary
[NASA-CR-171661] N83-24526
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436

E

EARLY STARS
Properties of young clusters near reflection nebulae
[NASA-CR-170305] N83-25628
EARLY WARNING SYSTEMS
Infrared satellite technology study
[AD-A123631] N83-24536
EARTH (PLANET)
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540
EARTH ATMOSPHERE
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres
[AD-A123396] N83-25257
EARTH AXIS
Polar motion prediction analysis
[AD-A124198] N83-25250
EARTH CRUST
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
Polar motion prediction analysis
[AD-A124198] N83-25250
EARTH MANTLE
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638
EARTH MOVEMENTS
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
Polar motion prediction analysis
[AD-A124198] N83-25250
EARTH OBSERVATIONS (FROM SPACE)
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide
[NASA-CR-166063] N83-24544
Perspectives in remote sensing in Brazil. An approach of the remote sensing applications to Earth resources surveys
[E83-10290] N83-24994
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
EARTH RESOURCES
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data
[DE82-009646] N83-25016
Energy sources and climate
[DE82-020612] N83-25334
EARTH TIDES
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
ECOLOGY
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
ECONOMIC ANALYSIS
Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities
[DOE/ET-20279/185] N83-25052
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121
Induced fractures: Well stimulation through fracturing
[DE82-019554] N83-25262
ECONOMIC DEVELOPMENT
Report on the status at DSR/INPE on applying remote sensing to geology
[INPE-2633-RPE/426] N83-25239
ECONOMIC FACTORS
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
ECONOMICS
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717
Low-cost process-heat recovery
[DE82-016652] N83-25138
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
Heber Known Geothermal Resources Area ethanol-fuel facility
[DE83-004775] N83-25209
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
ECOSYSTEMS
Environmental Sciences Division report
[ORNL-5900] N83-25218
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
Energy-related pollution of semi-tropical and tropical nearshore ecosystems
[DE83-005136] N83-25237
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
EDDY CURRENTS
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585
EDGES
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
EDUCATION
Forms of understanding in mathematical problem solving
[AD-A123384] N83-25454
EFFICIENCY
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation
[DE83-005168] N83-24827
Optical components for the Nova laser
[DE82-017294] N83-24850
Earth thermal-storage-assisted heat pump
[DE82-020823] N83-25157
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Heat rejection and energy extraction within solar ponds
[DE82-009487] N83-25196
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
EFFLUENTS
Catalytic reduction of nitrogen dioxide
[AD-A123176] N83-24587
EIGENVALUES
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues
[INPE-2565-MD/020-PT-2] N83-25613
EJECTORS
Proceedings: Ejector Workshop for Aerospace Applications
[AD-A124264] N83-24510
Experimental investigation of high performance, short, thrust augmenting ejectors — V/STOL aircraft
[AD-A125529] N83-24809
ELASTIC DEFORMATION
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
ELASTIC PROPERTIES
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
The design of single angle struts
[RR-CE-19] N83-24877
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914
ELASTIC SCATTERING
The Sandia nuclear microprobe
[DE83-005363] N83-24839
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508
ELASTIC SHELLS
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503
ELASTIC WAVES
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A123541] N83-24577
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460
ELASTOHYDRODYNAMICS
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862
ELASTOMERS
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
ELASTOPLASTICITY
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867
ELECTRIC ARCS
Detection of arcing faults on distribution feeders
[DE83-900993] N83-24788
ELECTRIC BATTERIES
Cycle life test and failure model of nickel-hydrogen cells
[NASA-TM-83375] N83-25038
Research, development, and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021266] N83-25137
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169
ELECTRIC BRIDGES
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit
[NASA-CASE-NPO-16021-1] N83-24769
ELECTRIC CHARGE
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge
[AD-A123670] N83-24776
ELECTRIC COILS
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912
ELECTRIC CONNECTORS
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768
ELECTRIC CONTACTS
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595
ELECTRIC DISCHARGES
Design of electron-beam controlled switches
[AD-A124312] N83-24785
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853

ELECTRIC ENERGY STORAGE
Single cell performance studies on the Fe/Cr Redox Energy Storage System using mixed reactant solutions at elevated temperature
[NASA-TM-83385] N83-25042

ELECTRIC FIELDS
The plasma experiment on board meteosat-F2
[AD-A123377] N83-24535
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge
[AD-A123670] N83-24776
Study of certain plane spiral deflecting systems of traveling-wave tubes
[DE83-005024] N83-24792
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901
A hybrid charged-particle guide for studying (n, charged particle) reactions
[DE82-020864] N83-25512

ELECTRIC FILTERS
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596

ELECTRIC GENERATORS
Advanced electrical power system technology for the all electric aircraft
[NASA-TM-83390] N83-24764
Advanced coal-gasification system for electric-power generation
[DE82-021338] N83-25141
Wind-assist irrigation and electrical-power generation
[DE83-900882] N83-25212

ELECTRIC HYBRID VEHICLES
Electric-hybrid-vehicle simulation
[DE82-020838] N83-24791

ELECTRIC MOTOR VEHICLES
Report for 1981 on research, development and demonstration of nickel-zinc batteries for electric vehicle propulsion
[ANL/OPEM-81-12] N83-25045
Applied battery and electrochemical research program
[DE82-020600] N83-25132
Research, development, and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021266] N83-25137

ELECTRIC POTENTIAL
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111

ELECTRIC POWER PLANTS
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
Goodyear Lake hydroelectric generating station redevelopment
[DE83-004753] N83-25127
Advanced coal-gasification system for electric-power generation
[DE82-021338] N83-25141
Shenandoah Solar Total-Energy Project
[DE83-005244] N83-25168
Energy-related pollution of semi-tropical and tropical nearshore ecosystems
[DE83-005136] N83-25237

ELECTRIC POWER SUPPLIES
Power conditioning subsystem design
[AD-A124191] N83-25113

ELECTRIC POWER TRANSMISSION
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552

ELECTRIC SWITCHES
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768

ELECTRICAL FAULTS
Detection of arcing faults on distribution feeders
[DE83-900993] N83-24786

ELECTRICAL INSULATION
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775

ELECTRICAL MEASUREMENT
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
Source for reference cells N83-25106
An approved laboratory program for photovoltaic reference cell development N83-25107
Spectral response measurements for solar cells N83-25110

ELECTRICAL PROPERTIES
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586

ELECTRICAL RESISTANCE
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595

ELECTRICAL RESISTIVITY
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959

ELECTRO-OPTICS
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980)
[AD-A123517] N83-25323
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539
Instrumentation and data acquisition for satellite testing in nuclear environments
[AD-A123560] N83-25554
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556

ELECTROCHEMICAL CELLS
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633
Selection and evaluation of materials for electrochemical energy conversion devices: Electrochemical evaluation of nickel whisker electrodes N83-25060
Applied battery and electrochemical research program
[DE82-020600] N83-25132

ELECTROCHEMISTRY
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions
[DE83-900751] N83-24616
An analysis of electrochemical deburring
[DE82-020881] N83-24620
Electrochemical aspects of stress-corrosion crack growth
[DE82-021543] N83-24680

ELECTRODES
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
Selection and evaluation of materials for electrochemical energy conversion devices: Electrochemical evaluation of nickel whisker electrodes N83-25060
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
Preliminary investigations of thermionic converters utilizing HOTEMA and DFVLR electrodes
[DE83-004107] N83-25203
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

ELECTRODIALYSIS
Desalting seawater and brackish waters: 1981 cost update
[DE82-020482] N83-24629

ELECTRODISSOLUTION
Electrochemical aspects of stress-corrosion cracking of sensitized stainless steels
[DE82-020003] N83-24688

ELECTRODYNAMICS
Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24888

ELECTROENCEPHALOGRAPHY
L-tryptophan: Effects on daytime sleep latency and the waking EEG
[AD-A123633] N83-25354
Sleep spindle and delta changes during chronic use of a short-acting and a long-acting benzodiazepine hypnotic
[AD-A123149] N83-25360

ELECTROLYSIS
Static feed water electrolysis for large scale hydrogen generation N83-25059

ELECTROLYTES
An analysis of electrochemical deburring
[DE82-020881] N83-24620
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-012700] N83-25047
Status of the development of solid polymer electrolyte water electrolysis for large scale hydrogen generation N83-25058
Research of advanced electrolytic hydrogen production N83-25061

ELECTROMAGNETIC COMPATIBILITY
Solid state EMC technology Development
[AD-A123705] N83-24749
Impedance and current of insulated and end-grounded linear antennas in seawater
[AD-A123345] N83-24751

ELECTROMAGNETIC INTERACTIONS
Electroweak interactions
[DE82-020146] N83-25494

ELECTROMAGNETIC INTERFERENCE
Interference to television reception from large wind turbines
[BBC-RD-1983/2] N83-24741

ELECTROMAGNETIC RADIATION
A finite element computation of the electromagnetic fields within an engine inlet model
[AD-A124684] N83-24752
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766
Study of certain plane spiral deflecting systems of traveling-wave tubes
[DE83-005024] N83-24792
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793

ELECTROMAGNETIC SCATTERING
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24746

ELECTROMAGNETISM
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester
[AD-A124267] N83-24835
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958

ELECTROMECHANICAL DEVICES
Performance interface document for users of Tracking and Data Relay Satellite System (TDRSS) electromechanically steered antenna systems (EMSAS)
[NASA-TM-84953] N83-24545
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
A broadbased actuator concept for spaceflight application N83-24885
Cannon launched electromechanical control actuation system development N83-24893

ELECTRON ACCELERATION
Energy scaling laws for the racetrack induction accelerator
[AD-A123659] N83-25507

ELECTRON BEAM WELDING
Centerline cracking in electron-beam cap-to-header welds in type 304L stainless steel
[DE82-020858] N83-24689

ELECTRON BEAMS
Design of electron-beam controlled switches
[AD-A124312] N83-24785

ELECTRON CAPTURE
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509

ELECTRON DENSITY (CONCENTRATION)
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment --- controlled fusion
[CEA-R-5153] N83-25562
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571

Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594
Electron densities in a solar flare derived from X-ray spectra
[AD-A111360] N83-25647

ELECTRON EMISSION
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586

ELECTRON ENERGY
The plasma experiment on board meteosat-F2
[AD-A123377] N83-24535
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571

ELECTRON GUNS
Bonded stacked-ring insulator for the Antares electron gun
[DE82-017586] N83-24851

ELECTRON IRRADIATION
Formation of silicon nitride structures by direct electron-beam writing
[AD-A124344] N83-25588

ELECTRON MICROSCOPY
Structure of Surfaces of Interfaces
[DE82-019302] N83-25606

ELECTRON PHONON INTERACTIONS
Optical pumping of hot phonons in GaAs
[DE82-020519] N83-24852

ELECTRON PLASMA
Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569

ELECTRON SCATTERING
Electroweak interactions
[DE82-020146] N83-25494
Collisionally excited few-electron systems: Theoretical introduction and survey
[DE82-020805] N83-25516
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566

ELECTRON TRANSITIONS
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594

ELECTRON TUNNELING
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions
[AD-A123554] N83-24784

ELECTRONIC EQUIPMENT TESTS
Capacity selector value electronics enclosure assembly controller card assembly test specifications
[AD-A123539] N83-24772

ELECTRONICS
Solid state EMC technology Development
[AD-A123705] N83-24749

ELECTRONS
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793

ELECTROSTATICS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574

ELEVONS
Aerothermal environment in control surface gaps in hypersonic flow: An overview
[NASA-TM-84662] N83-24794

ELLIPTIC DIFFERENTIAL EQUATIONS
Transformation of two and three-dimensional regions by elliptic systems
[NASA-CR-170310] N83-25430
Mean values of subsolutions of elliptic and parabolic equations
[AD-A124355] N83-25449

EMBRITTLEMENT
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields
[DE82-904603] N83-24690
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029

EMERGENCIES
Analysis of the comprehensive energy emergency response procedures report
[GAO/RCED-83-106] N83-25624

EMISSION
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578

EMISSION SPECTRA
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604
Extended near infrared emission from visual reflection nebulae
[NASA-TM-85315] N83-25629
Ultraviolet lines from emission line giants
[INPE-2690-PRE/289] N83-25633

EMISSIVITY
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles
[NASA-CR-170338] N83-25505

ENAMELS
Vitreous enamel damping material development
[AD-A124290] N83-24697

ENCAPSULATING
Welding iridium heat-source capsules for space missions
[DE82-020098] N83-24865
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595

END PLATES
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields
[DE82-904603] N83-24690

ENERGY ABSORPTION
Impact damage of composite plates
[NASA-CR-170309] N83-24558

ENERGY CONSERVATION
Standartized EMCS energy savings calculations
[AD-A123383] N83-24731
Predicting energy savings attributed to daylighting
[DE82-022038] N83-25134
Low-cost process-heat recovery
[DE82-016652] N83-25138
Earth thermal-storage-assisted heat pump
[DE82-020823] N83-25157
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview
[DE82-020818] N83-25164
Supply curves of conserved energy
[DE82-020066] N83-25188

ENERGY CONSUMPTION
Data report for the Northeast Residential Experiment Station, November 1981
[DOE/ET-20279/182] N83-25055
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080
Geothermal development plan: Cochise/Santa Cruz Counties
[DE83-004880] N83-25206
Wind-assist irrigation and electrical-power generation
[DE83-900882] N83-25212

ENERGY CONVERSION
Applications of multiproperty analysis in the prediction of complex-system thermophysical behavior
[DE82-020859] N83-24603
Single cell performance studies on the Fe/Cr Redox Energy Storage System using mixed reactant solutions at elevated temperature
[NASA-TM-83385] N83-25042
Selection and evaluation of materials for electrochemical energy conversion devices: Electrochemical evaluation of nickel whisker electrodes N83-25060
Some exploratory considerations of scale effects on the potential performance of wood energy conversion systems
[DE83-001378] N83-25122
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017041] N83-25179
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix 8 B
[DE82-017047] N83-25181
Liquid fossil-fuel technology
[DE82-020005] N83-25183
Central Arkansas Energy Project. Coal to medium-Btu gas
[DE82-017577] N83-25184
Dynamic behavior of a class of photovoltaic converters
[DE82-019344] N83-25190
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210

ENERGY CONVERSION EFFICIENCY
Spectrophotovoltaic orbital power generation
[NASA-CR-170754] N83-25040
Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156

ENERGY DISSIPATION
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576

ENERGY LEVELS
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment --- controlled fusion
[CEA-R-5153] N83-25562

ENERGY POLICY
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717
Energy. A continuing bibliography with indexes, issue 36, January 1983
[NASA-SP-7043(36)] N83-25025
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148
US Department of Energy wind turbine candidate site program: The regulatory process
[DE82-018444] N83-25153
Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Analysis of the comprehensive energy emergency response procedures report
[GAO/RCED-83-106] N83-25624

ENERGY SOURCES
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview
[DE82-020818] N83-25164
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
Energy sources and climate
[DE82-020612] N83-25334

ENERGY SPECTRA
Spectrophotovoltaic orbital power generation
[NASA-CR-170754] N83-25040
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543

ENERGY STORAGE
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
Electric-hybrid-vehicle simulation
[DE82-020838] N83-24791
Cycle life test and failure model of nickel-hydrogen cells
[NASA-TM-83375] N83-25038
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Assessment of energy storage for solar applications N83-25076
Effects on soils from hot storage tanks N83-25085
Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121
Report to the Congress: Regional petroleum reserves
[DE83-005270] N83-25124
Applied battery and electrochemical research program
[DE82-020600] N83-25132
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145

Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156
Earth thermal-storage-assisted heat pump
[DE82-020823] N83-25157
Heat-pump cool storage in a clathrate of freon
[DE82-020840] N83-25158
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview
[DE82-020818] N83-25164
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201

ENERGY TECHNOLOGY
Energy. A continuing bibliography with indexes, issue 36, January 1983
[NASA-SP-7043(36)] N83-25025
Community energy management: An annotated bibliography
[ANL/CNSV-29] N83-25046
An assessment of the basic energy science program. Volume 1: Technical Report
[DOE/ER-0123] N83-25056
Advanced-fuel-cell development
[DE82-021272] N83-25136
Wind-energy program
[DE82-014199] N83-25150
Wind-turbine-performance assessment
[DE82-905281] N83-25152
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2
[DE82-016339] N83-25185
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
Identification of data gaps and research needs for solid wastes from synfuel technologies
[DE83-000936] N83-25216

ENERGY TRANSFER
The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
Energy transfer mechanism switching in disordered solids
[AD-A123448] N83-25598

ENGINE AIRFRAME INTEGRATION
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics --- Langley 16-ft transonic tunnel tests
[NASA-TP-2158] N83-24478

ENGINE DESIGN
Opportunities for research in aerothermodynamics
[NASA-TM-83348] N83-24506
Research and development of the turbofan engine (the 2nd phase, FJR 710)
[NAL-TR-741] N83-24508

ENGINE INLETS
A finite element computation of the electromagnetic fields within an engine inlet model
[AD-A124684] N83-24752

ENGINE TESTS
Analysis of strain gage reliability in F-100 jet engine testing at NASA Lewis Research Center N83-24829
Testing and performance characteristics of a 1-kW free piston Stirling engine
[NASA-TM-82999] N83-25036

ENGINEERING MANAGEMENT
Cumulative reports and publications thru 31 December 1982
[NASA-CR-166116] N83-25377

ENTHALPY
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859

ENTRAINMENT
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144

ENTROPY (STATISTICS)
N-width and entropy of H(p)-classes in L(g) (-1,1)
[AD-A124346] N83-25445

ENVIRONMENT EFFECTS
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Heber Known Geothermal Resources Area ethanol-fuel facility
[DE83-004775] N83-25209
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters
[DE83-005711] N83-25224
Acid rain: A background report
[DE83-901079] N83-25236
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

ENVIRONMENT MANAGEMENT
Lessening the scope of federal coastal zone management: What's at stake
[DE83-004048] N83-25233

ENVIRONMENT MODELS
Basic techniques in environmental simulation
[AD-A123342] N83-25325

ENVIRONMENT PROTECTION
Possible storage sites for disposal and environmental control of atmospheric carbon dioxide
[DE83-005993] N83-25229

ENVIRONMENTAL MONITORING
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho
[E83-10289] N83-25024
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
Environmental monitoring
[DE82-021559] N83-25228

ENVIRONMENTAL TESTS
Evaluation of Precision Approach Path Indicator (PAPI)
[FAA-CT-82-153] N83-24495

EPHEMERIDES
Temporal image normalization
[AD-A123313] N83-25010

EPOXY COMPOUNDS
Latch fittings for the scientific instruments on the space telescope N83-24898

EPOXY RESINS
Failure mechanics in low-velocity impacts on thin composite plates
[NASA-TP-2152] N83-24562

EQUATIONS OF MOTION
Continuum modeling of two-phase flows
[AD-A124385] N83-24812
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813
Theoretical method for calculating relative joint geometry of assembled robot arms
[NASA-TP-2155] N83-25438
Initial boundary value problems for the equations of motion of compressible viscous and heat-conductive fluids
[AD-A124382] N83-25440

EQUILIBRIUM EQUATIONS
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436

EQUIPMENT SPECIFICATIONS
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913

ERGOMETERS
Calibrator for an electromagnetically braked bicycle ergometer
[AD-A122511] N83-25363

EROSION
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641

ERROR ANALYSIS
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
Some error sources in electrical test elements for thin-film solar cells N83-25097
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
Some statistical problems inherent in measuring precipitation N83-25284
Raingage network sampling statistics N83-25286
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287
Guidelines for correction of radiosonde-derived refractive profiles and climatologies
[AD-A124351] N83-25322

ERROR CORRECTING CODES
A robust ratio-threshold technique to mitigate tone and partial band jamming in coded frequency hopped communication links
[AD-A123559] N83-24753

ERRORS
An analysis of reports of operational errors
[AD-A123416] N83-24499
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Sampling problems: The small scale structure of precipitation N83-25283
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544

ESTERS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
Lubricant foaming and aeration study
[AD-A124184] N83-24696
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708

ESTIMATES
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force)
[NAL-TR-751] N83-24475
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295

ESTIMATING
Determination of artificial satellite attitude by estimates of state
[INPE-2608-TDL/105] N83-24530
A survey of passive microwave and hybrid remote sensing of precipitation N83-25299
Software for estimating sparse Jacobian matrices
[DE82-021234] N83-25421
Spectral estimation: An overdetermined rational model equation approach
[AD-A123676] N83-25456
Filtering of systems with nonlinearities
[AD-A124635] N83-25459
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462
Moment series for moment estimators of the parameters of a Weibull density
[DE82-018265] N83-25473

ETCHING
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693
Propellant/material compatibility program and results: Ten-year milestones
[NASA-CR-170346] N83-24710

ETHANE
Heber Known Geothermal Resources Area ethanol-fuel facility
[DE83-004775] N83-25209

ETHERS
On some derivatives of phenylethers, 2
[NASA-TM-77020] N83-24555

ETHYL ALCOHOL
LOX/hydrocarbon auxiliary propulsion system study [NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study [NASA-CR-171656] N83-24551
Alcohol/petroleum systems as fuels for diesel engines [DE82-020752] N83-24721
ETHYLENEDIAMINETETRAACETIC ACIDS
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex [AD-A124302] N83-24583
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions [DE83-900751] N83-24616
EULER EQUATIONS OF MOTION
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm [NASA-TM-83376] N83-24467
EUROPA
Research in planetary astronomy and operation of Mauna Kea Observatory [NASA-CR-170246] N83-25631
EUTECTICS
High temperature active heat exchanger research for latent heat storage N83-25091
EVALUATION
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C) [NASA-TM-83355] N83-24638
Alcohol/petroleum systems as fuels for diesel engines [DE82-020752] N83-24721
Evaluation of hydrothermal resources of North Dakota, phase 3 [DE83-004641] N83-25023
Chemical heat pump cost effectiveness evaluation N83-25067
Metal-hydride heat-pump performance studies N83-25069
Evaluation of olivine refractories for TES N83-25070
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico [DE82-012060] N83-25189
Evaluation of dual-energy-use systems. Volume 1: Executive summary [DE83-900758] N83-25198
Evaluation of dual-energy-use systems, volume 2 [DE83-900757] N83-25199
EVANESCENCE
Quasi-optic studies of dielectric radomes and lenses [AD-A124371] N83-24761
EVAPORATION
The structure of evaporating and combusting sprays: Measurements and predictions [NASA-CR-170312] N83-24795
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements — Kansas and Indiana [E83-10293] N83-24996
EVAPORATIVE COOLING
Design evaluation of an improved indirect evaporative cooling system [DE83-900876] N83-25213
EVAPORATORS
Development of a condenser for the dual catalyst water recovery system [NASA-CR-166478] N83-25372
EVEN-EVEN NUCLEI
Uranium disequilibrium measurements on groundwaters N83-24945
EVOLUTION (DEVELOPMENT)
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats [NASA-CR-170332] N83-25343
EXCIMER LASERS
Efficient Raman conversion of XeCl laser into the blue-green region [AD-A124193] N83-24843
EXCITATION
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers [AD-A123178] N83-24845
Science and art in heavy-ion collisions [DE82-020497] N83-25513
EXERCISE PHYSIOLOGY
Salivary and plasma testosterone and cortisol during moderately heavy excercise [AD-A122107] N83-25352
Air Force physical fitness: As assessment of characteristics and programs which affect individual physical fitness [AD-A123022] N83-25359
EXHALATION
Computer-assisted system for determination of O2 consumption and Co2 production in man [AD-A122525] N83-25362
EXHAUST EMISSION
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes [NASA-CR-170760] N83-24531
Gas characterization from fluidized-bed coal gasification [DE82-021179] N83-24598
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite [DE82-020853] N83-24615
EXHAUST NOZZLES
Proceedings: Ejector Workshop for Aerospace Applications [AD-A124264] N83-24510
EXHAUST SYSTEMS
Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine [NASA-TM-83387] N83-25499
EXOBIOLOGY
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life [NASA-CP-2276] N83-24556
Aerospace Medicine and Biology: A cumulative index to the 1982 issues [NASA-SP-7011(241)] N83-25347
EXOSAT SATELLITE
European X-ray observatory satellite (Exosat) [NASA-NEWS-RELEASE-83-74] N83-24532
EXOTHERMIC REACTIONS
Infrared emission from gas-aerosol reactions [AD-A123365] N83-24578
EXPERIMENT DESIGN
Bib designs with blocks of maximal multiplicity [AD-A123220] N83-25492
EXPLORATION
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958
Appraisal of LANDSAT lineaments as faults in Western Kentucky [DE83-005412] N83-25019
EXPLOSIONS
Improved design for dynamically-loaded, threaded interfaces [DE82-012701] N83-24867
EXPLOSIVE DEVICES
TNT equivalency of Pentolite hemispheres [AD-A123340] N83-24712
EXPLOSIVE WELDING
Practical small-scale explosive seam welding N83-24896
EXPLOSIVES
Mallet impact test [DE83-001841] N83-24718
EXPONENTIAL FUNCTIONS
N-width and entropy of H(p)-classes in L(g) (-1,1) [AD-A124346] N83-25445
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions [AD-A123388] N83-25467
EXPOSURE
Calibration of the active radiation detector for Spacelab-One [NASA-CR-170752] N83-24833
EXTERNAL STORE SEPARATION
Computer prediction of store aerodynamic loading during separation [AD-A124693] N83-24483
EXTERNAL STORES
Intumescent coating development [NASA-CR-170737] N83-24694
EXTERNAL TANKS
Ascent trajectory dispersion analysis [NASA-CR-170741] N83-24529
High-speed machining of Space Shuttle External Tank (ET) panels [NASA-CR-170751] N83-24537
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels [NASA-CR-170738] N83-24727
EXTRACTION
Liquid fossil-fuel technology [DE82-020005] N83-25183
EXTRATERRESTRIAL LIFE
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life [NASA-CP-2276] N83-24556
EXTRATERRESTRIAL RADIATION
The space technology demand on materials and processes [NASA-TM-77041] N83-24528
EXTRAVEHICULAR ACTIVITY
The manned maneuvering unit flight controller arm N83-24897
EXTRAVEHICULAR MOBILITY UNITS
The manned maneuvering unit flight controller arm N83-24897
EXTREME ULTRAVIOLET RADIATION
Study of impurities in the tandem mirror experiment using extreme-ultraviolet spectroscopy [DE82-020610] N83-25582
EXTREMUM VALUES
Dynamic behavior of a class of photovoltaic converters [DE82-019344] N83-25190
Continuous multistate structure functions [AD-A123444] N83-25466
EYE (ANATOMY)
LENS* 4: A program for calculation of geometric optics of the human eye [DE83-003890] N83-25368

F

F REGION
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite [AD-A124291] N83-25245
Structure and dynamics of the winter polar cap F region [AD-A123706] N83-25247
FABRICATION
Stresses during fabrication of cylindrically woven carbon-carbon composites [AD-A123153] N83-24567
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity [DE82-020758] N83-24612
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit [NASA-CASE-NPO-16021-1] N83-24769
CAM highlights, FY 82 [AD-A123395] N83-25417
Lightweight Zerodur mirror technology [AD-A123538] N83-25555
Material growth and characterization for solid state devices [NASA-CR-170342] N83-25586
FACTOR ANALYSIS
A method for interpolating in Bondarenko factor tables and other functions [DE82-015685] N83-25470
FACTORIAL DESIGN
The user-assisted automated experimental (TEST) design program (AED): Version 2 [AD-A124303] N83-25400
FACTORIZATION
LU decompositions of generalized diagonally dominant matrices [ORNL/CSD-98] N83-25491
FAILURE ANALYSIS
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna [DOT/FAA/PM-83/18] N83-24492
Failure mechanics in low-velocity impacts on thin composite plates [NASA-TP-2152] N83-24562
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys [AD-A123693] N83-24644
A refrigerated dynamic seal [NASA-TM-83378] N83-24798
Development of the charge amplifier for piezoelectric accelerometer sensors [NAL-TR-749] N83-24832
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design [AD-A119497] N83-24880
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application [DE82-011435] N83-24913
Cycle life test and failure model of nickel-hydrogen cells [NASA-TM-83375] N83-25038
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays [TR-1981:49T] N83-25240
Flight systems safety program [DE82-021833] N83-25529

FAILURE MODES
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna
[DOT/FAA/PM-83/18] N83-24492
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867
FAINT OBJECT CAMERA
Polarizer mechanism for the space telescope faint object spectrograph N83-24887
FARMLANDS
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California
[NASA-TM-84317] N83-25003
FATIGUE (BIOLOGY)
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357
FATIGUE (MATERIALS)
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design
[AD-A119497] N83-24880
FATIGUE LIFE
Flywheel testing and evaluation
[DE82-020894] N83-25160
FATIGUE TESTS
Flywheel evaluation at ORFEL rotor testing in FY 1982
[DE82-020825] N83-25161
FAULT TOLERANCE
Demonstration Advanced Avionics System (DAAS). Phase 1 report
[NASA-CR-170317] N83-24504
FAULT TREES
Integrated assurance assessment of a reconfigurable digital flight control system
[NASA-CR-170281] N83-24515
FEASIBILITY ANALYSIS
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2
[DE82-016339] N83-25185
FEEDBACK CONTROL
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513
Adjustment of design parameters for improved feedback properties in the linear quadratic regulator
[AD-A124494] N83-24782
A random vibration control system for testing a single test item with multiple inputs
[DE82-018973] N83-24916
Singular differential game numerical technique and closed loop guidance and control strategies
[AD-A124625] N83-25484
FELDSPARS
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
FERMI SURFACES
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
FERRIMAGNETS
H5 fast-kicker-magnet pulser
[DE82-020002] N83-24790
FERRITES
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596
FERRITIC STAINLESS STEELS
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668
Irradiation experiment status and schedule N83-24669
Environmental effects on properties of structural alloys N83-24672
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
Compatibility studies of structural alloys with solid breeder N83-24674
FERROGRAPHY
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864
FIBER OPTICS
Unique developments in Lasar-Induced Fluorescence Fluorimetry (LIFF) N83-24992
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
Low light level imaging design
[AD-A124283] N83-25547
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551
Raman investigation of the effects of fused silica fibers
[AD-A123549] N83-25553
Instrumentation and data acquisition for satellite testing in nuclear environments
[AD-A123560] N83-25554
FIBER REINFORCED COMPOSITES
Impact damage of composite plates
[NASA-CR-170309] N83-24558
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A123541] N83-24577
FIELD EFFECT TRANSISTORS
Noise and thermal contributions in transferred electron two and three terminal devices
[AD-A124326] N83-24756
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
FIGHTER AIRCRAFT
Computer prediction of store aerodynamic loading during separation
[AD-A124693] N83-24483
FILE MAINTENANCE (COMPUTERS)
File migration in distributed computer systems
[DE82-021572] N83-25383
FILLERS
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
FILM THICKNESS
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
FILTRATION
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes
[DE83-005635] N83-25536
FINES
Silicon carbide-reinforced plastic material
[DE83-004944] N83-24570
FINITE DIFFERENCE THEORY
Transformation of two and three-dimensional regions by elliptic systems
[NASA-CR-170310] N83-25430
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431
FINITE ELEMENT METHOD
Nonlinear transient analysis of layered composite plates
[AD-A123182] N83-24566
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691
Development of a coupled thermal-hydraulic-mechanical finite-element model for saturated fractured porous media N83-24942
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436
FINS
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program
[DE82-022078] N83-24736
FIRE CONTROL
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502
FIRE EXTINGUISHERS
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
FIRES
Large-scale pressurizable fire test facility, Fire 1
[AD-A124288] N83-24730
FITTING
FITS: A function-fitting program
[LA-9111-M] N83-25393
FITTINGS
Latch fittings for the scientific instruments on the space telescope N83-24898
Payload retention fittings for space shuttle payload ground handling mechanism N83-24906
FLAPS (CONTROL SURFACES)
Development of the flow field in streamwise corners at hypersonic speeds and effects of the corner flow on downstream fitted flaps
[ESA-TT-583] N83-24480
FLAT PLATES
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813
Low-cost process-heat recovery
[DE82-016652] N83-25138
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197
FLEXIBILITY
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538
FLEXIBLE SPACECRAFT
Modular design attitude control system
[NASA-CR-170736] N83-24541
FLIGHT CONTROL
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
Integrated assurance assessment of a reconfigurable digital flight control system
[NASA-CR-170281] N83-24515
FLIGHT CREWS
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265
FLIGHT SAFETY
National Airspace System Plan, facilities, equipment and associated development N83-24521
Flight systems safety program
[DE82-021833] N83-25529
FLIGHT SIMULATION
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
FLIGHT TESTS
Alaska Loran-C flight test evaluation
[FAA-PM-83-4] N83-24491
Evaluation of Precision Approach Path Indicator (PAPI)
[FAA-CT-82-153] N83-24495
FLIGHT TRAINING
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265
FLOOD PREDICTIONS
Agricultural requirements for precipitation measurements N83-25279
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294
FLOORS
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488

FLOW
Adiabatic deformation and strain localization
[AD-A123695] N83-24818
FLOW CHARACTERISTICS
A critical review of pulsating combustion
[TAE-468] N83-24576
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Calculations and measurements of the flow in a motored model engine and implications for open-chamber direct-injection engines
[DE83-019033] N83-24868
FLOW DISTORTION
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803
FLOW DISTRIBUTION
End-wall boundary layer measurements in a two-stage fan
[NASA-TM-83409] N83-24470
Development of the flow field in streamwise corners at hypersonic speeds and effects of the corner flow on downstream fitted flaps
[ESA-TT-583] N83-24480
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144
FLOW EQUATIONS
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
FLOW MEASUREMENT
End-wall boundary layer measurements in a two-stage fan
[NASA-TM-83409] N83-24470
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539
FLOW RESISTANCE
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825
FLOW STABILITY
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
FLOW VELOCITY
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-20] N83-24804
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
Calculations and measurements of the flow in a motored model engine and implications for open-chamber direct-injection engines
[DE83-019033] N83-24868
Determining size and interconnection of fractures from constant-head well tests N83-24941
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403
FLOW VISUALIZATION
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
FLUID DYNAMICS
Summer Study Program in Geophysical Fluid Dynamics: Particle Motions in Fluids
[AD-A122864] N83-24932
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443
FLUID FILMS
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559
FLUID FLOW
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge
[AD-A123670] N83-24776
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
Theoretical model of fluid flow through a deformable rock fracture N83-24939
Porous media equivalent for a network of discontinuous fractures N83-24940
Development of a coupled thermal-hydraulic-mechanical finite-element model for saturated fractured porous media N83-24942
Geophysical borehole measurements in low-permeability rock N83-24955
The characterization of heat storage in confined aquifers with buoyancy flow N83-24975
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163
Heat rejection and energy extraction within solar ponds
[DE82-009487] N83-25196
FLUID MECHANICS
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640
FLUIDIZED BED PROCESSORS
Gas characterization from fluidized-bed coal gasification
[DE82-021179] N83-24598
Autoignition of kerosene in fluidized-bed pilot-plant calciners
[DE82-008764] N83-24610
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite
[DE82-020853] N83-24615
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
IGCC performance comparison for variations in gasifier type and gas turbine firing temperature
[NASA-TM-83310] N83-25037
Advanced coal-gasification system for electric-power generation
[DE82-021336] N83-25141
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres
[DE82-905772] N83-25182
FLUORESCENCE
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
Laser spectroscopy of combustion intermediates
[DE83-004869] N83-24590
Microspectroscopy
[DE82-020158] N83-24614
Unique developments in Laser-Induced Fluorescence Fluorimetry (LIFF) N83-24992
FLUORINE
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
FLUOROCARBONS
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593
FLUX DENSITY
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
Flywheel testing and evaluation
[DE82-020894] N83-25160
FLYWHEELS
Electric-hybrid-vehicle simulation
[DE82-020838] N83-24791
A compact magnetic bearing for gimballed momentum wheel N83-24903
Flywheel testing and evaluation
[DE82-020894] N83-25160
Flywheel evaluation at ORFEL rotor testing in FY 1982
[DE82-020825] N83-25161
FOAMS
Lubricant foaming and aeration study
[AD-A124184] N83-24696
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
FOCUSING
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer
[DE82-020169] N83-24849
Application of Robertson's collective focusing to final focusing
[DE83-004050] N83-25522
Studies of accelerated compact toruses
[DE83-005488] N83-25584
FOKKER-PLANCK EQUATION
Understanding tandem mirror devices N83-25118
FOLDING STRUCTURES
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
FORECASTING
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
FOREST MANAGEMENT
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho
[E83-10289] N83-25024
FORMAT
Agricultural requirements for precipitation measurements N83-25279
FORMATES
Applications of ion chromatography
[DE83-004942] N83-24632
FORTRAN
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions
[AD-A123406] N83-25413
FORWARD SCATTERING
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24746
FOSSIL FUELS
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675
Appraisal of LANDSAT lineaments as faults in Western Kentucky
[DE83-005412] N83-25019
Liquid fossil-fuel technology
[DE82-020005] N83-25183
Energy sources and climate
[DE82-020612] N83-25334
FOSSILS
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
FOUR BODY PROBLEM
Modular design attitude control system
[NASA-CR-170736] N83-24541
FOURIER ANALYSIS
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959
FOURIER TRANSFORMATION
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
FRACTIONATION
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-019722] N83-24621
FRACTOGRAPHY
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644

FRACTURE MECHANICS
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019106] N83-24568
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Theoretical model of fluid flow through a deformable rock fracture N83-24939
Determining size and interconnection of fractures from constant-head well tests N83-24941
Geophysical borehole measurements in low-permeability rock N83-24955
Studies of earth stress and rock properties and the hydraulic-fracturing process
[DE82-016779] N83-25259
Induced fractures: Well stimulation through fracturing
[DE82-019554] N83-25262

FRACTURE STRENGTH
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668

FRACTURES (MATERIALS)
Modeling of fracture reservoirs N83-24969

FRACTURING
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Studies of earth stress and rock properties and the hydraulic-fracturing process
[DE82-016779] N83-25259

FRAUNHOFER LINES
Spectroradiometer measurements in support of photovoltaic device testing N83-25103

FREE ENERGY
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032

FREE RADICALS
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506

FREON
Heat-pump cool storage in a clathrate of freon
[DE82-020840] N83-25158

FREQUENCY CONVERTERS
A 40 MHz - 2.2 MHz downconverter
[INPE-2607-NTE/194] N83-24770

FREQUENCY HOPPING
A robust ratio-threshold technique to mitigate tone and partial band jamming in coded frequency hopped communication links
[AD-A123559] N83-24753

FREQUENCY MEASUREMENT
Detection of arcing faults on distribution feeders
[DE83-900993] N83-24786

FREQUENCY MODULATION
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target
[AD-A124323] N83-24755

FRESNEL LENSES
Advanced concentrator cell research at Sandia National Laboratories
[DE82-005772] N83-25194
Design and development of a laminated Fresnel lens for point-focus PV systems, phase 2
[DE83-005935] N83-25560

FRICTION
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700

FRICTION FACTOR
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802

FRONTS (METEOROLOGY)
Severe storms requirements for precipitation information N83-25281
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321

FROST
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation
[DE83-005168] N83-24827

FUEL CELLS
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries
[NASA-TM-83386] N83-24571
Static feed water electrolysis for large scale hydrogen generation N83-25059
Advanced-fuel-cell development
[DE82-021146] N83-25131
Advanced-fuel-cell development
[DE82-021272] N83-25136

FUEL COMBUSTION
High-temperature combustion of pulverized coal
[DE82-022505] N83-24589
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies
[DE82-009791] N83-24592
Effects of preignition on pulverized-coal combustion
[DE82-020517] N83-24599
Computational tools for pulverized-coal combustion
[DE82-021387] N83-24602
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite
[DE82-020853] N83-24615

FUEL CONSUMPTION
Acid rain: Commentary on controversial issues and observations on the role of fuel burning
[DE82-016914] N83-25219

FUEL OILS
Analytical studies for the H-coal process
[DE82-019835] N83-24601

FUEL PUMPS
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714

FUEL SYSTEMS
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714

FUEL TANKS
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727

FUEL TESTS
Alcohol/petroleum systems as fuels for diesel engines
[DE82-020752] N83-24721

FUELS
Fuels combustion research
[AD-A123118] N83-24588
Transport characteristics of alternate supply fuels
[DE82-020246] N83-24720

FUNCTIONAL INTEGRATION
FITS: A function-fitting program
[LA-9111-M] N83-25393

FUNCTIONS (MATHEMATICS)
A method for interpolating in Bondarenko factor tables and other functions
[DE82-015685] N83-25470

FURNACES
Computational tools for pulverized-coal combustion
[DE82-021387] N83-24602
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704
Alternatives to ceramic bricks and ceramic brick systems N83-25071

FUSES (ORDNANCE)
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774

FUSION (MELTING)
Raman investigation of the effects of fused silica fibers
[AD-A123549] N83-25553

FUSION REACTORS
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668
Irradiation experiment status and schedule N83-24669
Fusion program research materials inventory N83-24670
Environmental effects on properties of structural alloys N83-24672
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673

G

GALILEO PROBE
The linear boom actuator designed for the Galileo spacecraft N83-24886

GALILEO SPACECRAFT
Nutation Damper System N83-24895
Design of the Galileo remote science pointing actuators N83-24902

GALLIUM ARSENIDES
Noise and thermal contributions in transferred electron two and three terminal devices
[AD-A124326] N83-24756
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24781
Reading and writing of photochemical holes using GaAlAs diode lasers
[AD-A124633] N83-24846
Optical pumping of hot phonons in GaAs
[DE82-020519] N83-24852
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600

GAME THEORY
Singular differential game numerical technique and closed loop guidance and control strategies
[AD-A124625] N83-25484
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
A game theory approach to search
[AD-A124631] N83-25486
Stochastic differential game techniques
[AD-A124634] N83-25487
The restricted Stackelberg problem
[AD-A124638] N83-25488

GAMMA FUNCTION
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25467

GAMMA RAYS
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 1: General narrative report
[DE82-011041] N83-25014
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data
[DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
Generators of coherent radiation from relativistic electrons
[DE82-020370] N83-25521

GAPS
Aerothermal environment in control surface gaps in hypersonic flow: An overview
[NASA-TM-84662] N83-24794

GAS ANALYSIS
Reproducibility of an automated laser Raman system for light gas analysis
[MLM-2804] N83-24841
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362

GAS CHROMATOGRAPHY
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity
[DE82-020758] N83-24612
Novel mesogenic polysiloxane solvents for gas-liquid chromatography
[DE82-020753] N83-24613

GAS COMPOSITION
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217

GAS EXCHANGE
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365

GAS INJECTION
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807

GAS IONIZATION
Design of electron-beam controlled switches
[AD-A124312] N83-24785
GAS MIXTURES
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres
[DE82-905772] N83-25182
GAS RECOVERY
Studies of earth stress and rock properties and the hydraulic-fracturing process
[DE82-016779] N83-25259
GAS STREAMS
Gas levitator having fixed levitation node for containerless processing
[NASA-CASE-MFS-25509-1] N83-24828
Metal hydride process for hydrogen recovery N83-25065
GAS TUNGSTEN ARC WELDING
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Welding iridium heat-source capsules for space missions
[DE82-020098] N83-24865
Case history of tantalum-weld cracking
[DE82-020358] N83-24917
GAS TURBINE ENGINES
Opportunities for research in aerothermodynamics
[NASA-TM-83348] N83-24506
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
GAS TURBINES
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675
IGCC performance comparison for variations in gasifier type and gas turbine firing temperature
[NASA-TM-83310] N83-25037
Feasibility case study of gas-turbine direct-heat industrial cogeneration
[DE83-005655] N83-25126
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211
GAS-ION INTERACTIONS
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509
GAS-LIQUID INTERACTIONS
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825
GASES
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578
Process for practically complete removal of hydrogen sulfide from low-pressure gases
[DE83-005022] N83-24631
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
Production and reactions of negative ions
[DE82-020824] N83-25520
GAUSS EQUATION
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260
GEARS
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864
Cannon launched electromechanical control actuation system development N83-24893
Hinge latch mechanism N83-24904
GELATION
Effect of additives on performance of hydrated salt TES systems N83-25075
GELS
Sorptive diffusion in clay gels N83-24947
GENERAL AVIATION AIRCRAFT
The return of the propeller airplane
[SNIAS-822-111-102] N83-24501
Demonstration Advanced Avionics System (DAAS). Phase 1 report
[NASA-CR-170317] N83-24504
Differential-absorption LIDAR technology for light twin-engine aircraft operation
[DE83-003888] N83-25232
Study of noise reduction characteristics of double-wall panels
[NASA-CR-170308] N83-25497
GENETIC CODE
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344
GEOCHEMISTRY
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Research on nuclear waste isolation at Stripa: An overview N83-24949
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
The Baca demonstration project N83-24967
Fluid sampling and analysis of geopressured brine N83-24972
Thermodynamics of high-temperature brines N83-24982
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 1: General narrative report
[DE82-011041] N83-25014
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
Potential of utilization of geothermal energy in Arizona
[DE83-004875] N83-25119
Mineralogy and chemistry of planets and meteorites
[NASA-CR-170345] N83-25637
GEODESY
Polar motion prediction analysis
[AD-A124198] N83-25250
GEODETIC SURVEYS
Long baseline (transoceanic) surveying using the global positioning system and its broadcast ephemeris
[AD-A123585] N83-24497
Rapid Geodetic Survey System (RGSS) deflection of the vertical and gravity anomaly tests at White Sands Missile Range, 1980
[AD-A124197] N83-25244
GEODYNAMICS
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
GEOIDS
The indirect effects on the computation of geoid undulations
[NASA-CR-170347] N83-25006
GEOLOGICAL FAULTS
Appraisal of LANDSAT lineaments as faults in Western Kentucky
[DE83-005412] N83-25019
GEOLOGICAL SURVEYS
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Methodology of remote sensing data interpretation and geological applications — Brazil
[E83-10299] N83-25002
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Appraisal of LANDSAT lineaments as faults in Western Kentucky
[DE83-005412] N83-25019
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530
GEOLOGY
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556
Generic studies of geothermal reservoir behavior N83-24970
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989
Report on the status at DSR/INPE on applying remote sensing to geology
[INPE-2633-RPE/426] N83-25239
Structural geology of the Moorman syncline area of western Kentucky
[DE82-022305] N83-25258
GEOMAGNETIC TAIL
Fine-scale structure of the Jovian magnetotail current sheet
[NASA-TM-85014] N83-25639
GEOMAGNETISM
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data
[DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
Maximum entropy spectral analysis of geomagnetic disturbance indices
[INPE-1693-RPE/120] N83-25242
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249
Interplanetary magnetic field and tropospheric circulation
[NASA-CR-170277] N83-25251
GEOMETRY
Porous media equivalent for a network of discontinuous fractures N83-24940
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Computational geometry on a systolic chip
[AD-A123362] N83-25382
Theoretical method for calculating relative joint geometry of assembled robot arms
[NASA-TP-2155] N83-25438
How to divide a polygon fairly
[AD-A123335] N83-25451
GEOMORPHOLOGY
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
GEOPHYSICS
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Summer Study Program in Geophysical Fluid Dynamics: Particle Motions in Fluids
[AD-A122864] N83-24932
Nuclear waste isolation, geophysics and reservoir engineering, geosciences
[DE83-004044] N83-24933
Geophysical borehole measurements in low-permeability rock N83-24955
Geophysical monitoring at the Cerro Prieto geothermal field N83-24979
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263
GEOPRESSURE
Subsidence modeling of the Pleasant Bayou geothermal geopressured region N83-24971
Fluid sampling and analysis of geopressured brine N83-24972
GEOTECHNICAL ENGINEERING
Low-to-moderate-temperature hydrothermal reservoir engineering handbook
[DE82-016282] N83-25149
GEOTEMPERATURE
Thermal history of the Georges Bank Basin N83-24929
GEOTHERMAL ENERGY EXTRACTION
Design of a diesel exhaust-gas purification system for inert-gas drilling
[DE82-017071] N83-24866

Generic studies of geothermal reservoir behavior
N83-24970
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155
Geothermal development plan: Pinal County
[DE83-004879] N83-25205

GEOTHERMAL ENERGY UTILIZATION
Geothermal development plan: Northern Arizona counties
[DE83-004878] N83-24554
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988
Potential of utilization of geothermal energy in Arizona
[DE83-004875] N83-25119
Maryvale Terrace: Geothermal residential district space heating and cooling
[DE83-005268] N83-25175
Geothermal heating for the Arizona Environmental Research Laboratory greenhouses
[DE83-005267] N83-25177
Geothermal development plan: Pinal County
[DE83-004879] N83-25205
Geothermal development plan: Cochise/Santa Cruz Counties
[DE83-004880] N83-25206
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
Geothermal development plan: Yuma County
[DE83-004882] N83-25208
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261

GEOTHERMAL RESOURCES
Nuclear waste isolation, geophysics and reservoir engineering, geosciences
[DE83-004044] N83-24933
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Simple one-dimensional inversions of magnetotelluric data N83-24962
Advances in transient well-testing methodology N83-24964
Low- to moderate-temperature hydrothermal reservoir engineering research N83-24965
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
The Baca demonstration project N83-24967
Injection of cold water into geothermal reservoirs N83-24968
Modeling of fracture reservoirs N83-24969
Generic studies of geothermal reservoir behavior N83-24970
Subsidence modeling of the Pleasant Bayou geothermal geopressured region N83-24971
Overview of the Mexican-American cooperative program at the Cerro Prieto geothermal field N83-24977
Geologic model of the Cerro Prieto geothermal field N83-24978
Geophysical monitoring at the Cerro Prieto geothermal field N83-24979
Reservoir engineering studies of the Cerro Prieto geothermal field N83-24980
The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981
Dickinson geothermal study
[DE82-016945] N83-25018
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004841] N83-25023
Potential of utilization of geothermal energy in Arizona
[DE83-004875] N83-25119
Geothermal development plan: Pima County
[DE83-004877] N83-25120
Advanced wellbore thermal simulator GEOTEMP2 research report
[DE82-020050] N83-25154
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155
Geothermal development plan: Pinal County
[DE83-004879] N83-25205
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
Geothermal development plan: Yuma County
[DE83-004882] N83-25208
Geothermal development plan: Maricopa County
[DE83-004876] N83-25214
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261
Induced fractures: Well stimulation through fracturing
[DE82-019554] N83-25262

GEOTHERMAL TECHNOLOGY
Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155

GETTERS
Developments toward an 18% efficient silicon solar cell
[NASA-CR-168141] N83-25112

GEYSERS
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988

GHOSTS
Interference to television reception from large wind turbines
[BBC-RD-1983/2] N83-24741

GIANT STARS
Ultraviolet lines from emission line giants
[INPE-2690-PRE/289] N83-25633

GIMBALS
The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899

GLACIERS
Carbon Dioxide Effects Research and Assessent Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222

GLASS
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
Oxide and halide laser glasses
[DE82-020162] N83-24854
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197
Lightweight Zerodur mirror technology
[AD-A123538] N83-25555

GLASS FIBER REINFORCED PLASTICS
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705

GLASS LASERS
Oxide and halide laser glasses
[DE82-020162] N83-24854

GLIDE PATHS
Evaluation of Precision Approach Path Indicator (PAPI)
[FAA-CT-82-153] N83-24495

GLOBAL ATMOSPHERIC RESEARCH PROGRAM
Some statistical problems inherent in measuring precipitation N83-25284

GLOBAL POSITIONING SYSTEM
Long baseline (transoceanic) surveying using the global positioning system and its broadcast ephemeris
[AD-A123585] N83-24497

GOVERNMENTS
Lessening the scope of federal coastal zone management: What's at stake
[DE83-004048] N83-25233

GRADIENTS
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341

GRAIN BOUNDARIES
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
Orientation of ceramic microstructures by hot-forming methods
[DE83-005232] N83-24707
Structure of Sunaces of Interfaces
[DE82-019302] N83-25606
Structure of large-angle grain boundaries in metals and ceramic oxides
[DE82-022006] N83-25608
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609

GRAMMARS
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394

GRANITE
Thermomechanical properties of Stripa granite N83-24951
Rod-type extensometers in long-term elevated temperature service N83-24953
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Geophysical borehole measurements in low-permeability rock N83-24955
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Modeling of nuclear waste disposal by rock melting
[DE82-012798] N83-25535

GRAPHITE
Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605

GRAPHITE-EPOXY COMPOSITES
Impact damage of composite plates
[NASA-CR-170309] N83-24558
Orthotic devices using lightweight composite materials
[NASA-CR-166105] N83-24560
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019108] N83-24568
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading
[DE83-005706] N83-24589

GRAPHITE-POLYIMIDE COMPOSITES
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561

GRATINGS (SPECTRA)
Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551

GRAVIMETRY
The indirect effects on the computation of geoid undulations
[NASA-CR-170347] N83-25006
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions
[AD-A123406] N83-25413
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469

GRAVITATION
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823

GRAVITATIONAL EFFECTS
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813

GRAVITY ANOMALIES
Rapid Geodetic Survey System (RGSS) deflection of the vertical and gravity anomaly tests at White Sands Missile Range, 1980
[AD-A124197] N83-25244
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469

GRAVITY PROBE B
Liquid helium management for Gravity Probe-B
[NASA-TM-82521] N83-24830

GRAZING INCIDENCE
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24746
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543

GREASES
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864

GREEN FUNCTION
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958
Green's functions at zero viscosity
[DE83-004528] N83-25475

GREENHOUSES
Geothermal heating for the Arizona Environmental Research Laboratory greenhouses [DE83-005287] N83-25177
GRINDING (COMMINUTION)
High-temperature combustion of pulverized coal [DE82-022505] N83-24589
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies [DE82-009791] N83-24592
Effects of preignition on pulverized-coal combustion [DE82-020517] N83-24599
GRINDING (MATERIAL REMOVAL)
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report [NASA-CR-170742] N83-25537
GROUND STATE
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia [NASA-TM-84359] N83-25630
GROUND SUPPORT EQUIPMENT
Rolling beam umbilical system N83-24900
Payload retention fittings for space shuttle payload ground handling mechanism N83-24906
GROUND TRUTH
Ground-truth measurement systems N83-25272
A survey of radar rain measurement techniques N83-25290
Ground truth for oceanic rainfall N83-25291
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
GROUND WATER
Uranium disequilibrium measurements on groundwaters N83-24945
Research on nuclear waste isolation at Stripa: An overview N83-24949
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho [DE83-004483] N83-25022
Evaluation of hydrothermal resources of North Dakota, phase 3 [DE83-004641] N83-25023
Heat storage in rock: Multiple well system [TULEA-1981:28] N83-25048
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters [DE83-005711] N83-25224
GUIDANCE (MOTION)
Singular differential game numerical technique and closed loop guidance and control strategies [AD-A124625] N83-25484
GUIDE VANES
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle [AD-A124688] N83-24511
GUST ALLEVIATORS
Ride quality systems for commuter aircraft [NASA-CR-166118] N83-24512
GUST LOADS
Calculation of wing response to gusts and blast waves with vortex lift effect [NASA-CR-170340] N83-24796
Vector wind profile gust model [NASA-CR-170762] N83-25320
GYPSUM
Thermodynamics of high-temperature brines N83-24982

H

HABITATS
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho [E83-10289] N83-25024
HADRONS
Alloy development for irradiation performance [DE83-006357] N83-24648
HALIDES
Oxide and halide laser glasses [DE82-020162] N83-24854
HALL EFFECT
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester [AD-A124267] N83-24835
HAMILTONIAN FUNCTIONS
Natural Poisson structures of nonlinear plasma dynamics [DE82-019299] N83-25572
HANDBOOKS
Proposed MIL standard and handbook: Flying qualities of air vehicles. Volume 1: Proposed MIL standard [AD-A123674] N83-24468
HARBORS
HHE/LORAN-C surveying [AD-A124343] N83-24498
HARDENING (MATERIALS)
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source [NASA-TP-2149] N83-24640
HARDNESS
Investigation of role of subsurface zones in wear of materials [DE83-900849] N83-24691
HARMONIC ANALYSIS
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions [AD-A123406] N83-25413
HARMONIC OSCILLATION
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions [AD-A123554] N83-24784
Behavior of nuclei at high angular momentum [DE82-020267] N83-25514
HARMONICS
Maximum entropy spectral analysis of geomagnetic disturbance indices [INPE-1693-RPE/120] N83-25242
HARTREE APPROXIMATION
Science and art in heavy-ion collisions [DE82-020497] N83-25513
HEALTH
The long range transport of air pollution [DOE/EP-0037] N83-25221
Space Physiology and Medicine [NASA-SP-447] N83-25349
HEARING
Longitudinal study of human hearings: Its relationship to noise and other factors. 3: Results from the first five years [AD-A123175] N83-25355
HEART DISEASES
An assessment of the relationship between the coronary-prone (type A) behavior pattern, stress, and coronary heart disease [AD-A122809] N83-25358
HEAT BUDGET
Needs, opportunities and strategies for a long-term oceanic sciences satellite program [NASA-CR-170275] N83-25339
HEAT EXCHANGERS
A refrigerated dynamic seal [NASA-TM-83378] N83-24798
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system [DE83-005174] N83-24823
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project [NASA-CR-170213] N83-25027
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Silicon crystal growth in vacuum N83-25031
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033
Effect of additives on performance of hydrated salt TES systems N83-25075
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080
TES technology transfer in the pulp and paper industry N83-25081
High temperature active heat exchanger research for latent heat storage N83-25091
HEAT FLUX
Results of solar testing of circular foil heat-flux sensors at the White Sands solar furnace [DE82-006282] N83-25142
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres [AD-A123396] N83-25257
HEAT MEASUREMENT
Thermodynamic properties of silicate materials N83-24984
Results of solar testing of circular foil heat-flux sensors at the White Sands solar furnace [DE82-006282] N83-25142
HEAT OF FUSION
Some aspects of the computer simulation of conduction heat transfer and phase change processes [ORNL/CSD-100] N83-24801
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089
High temperature active heat exchanger research for latent heat storage N83-25091
HEAT PIPES
Computer modeling of heat pipe performance [NASA-CR-171641] N83-24806
Long titanium heat pipes for high-temperature space radiators [DE82-014069] N83-24819
Artery heat pipes for space-power systems [DE82-015445] N83-24822
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies [DE82-016073] N83-25147
HEAT PUMPS
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation [DE83-005168] N83-24827
Chemical heat pump cost effectiveness evaluation N83-25067
Metal hydride/chemical heat pump development project N83-25068
Metal-hydride heat-pump performance studies N83-25069
Mathematical modeling of TES subsystems N83-25079
Earth thermal storage for enhanced performance of air-to-air heat pumps [DE83-020773] N83-25156
Earth thermal-storage-assisted heat pump [DE82-020823] N83-25157
Heat-pump cool storage in a clathrate of freon [DE82-020840] N83-25158
A comparison of laboratory and field-test measurements of heat-pump water heaters [DE82-020810] N83-25165
HEAT RESISTANT ALLOYS
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C) [NASA-TM-83355] N83-24638
Artery heat pipes for space-power systems [DE82-015445] N83-24822
HEAT SHIELDING
The effect of asymmetric attack on trim angle of attack [NASA-TM-84309] N83-24473
HEAT SINKS
A refrigerated dynamic seal [NASA-TM-83378] N83-24798
HEAT STORAGE
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices [DE82-020827] N83-24704
Development of heat-storage building materials for passive-solar applications [DE82-020804] N83-24735
Some aspects of the computer simulation of conduction heat transfer and phase change processes [ORNL/CSD-100] N83-24801
Simulation of thermal energy storage in a doublet well system N83-24973
A dimensionless parameter approach to the thermal behavior of an aquifer thermal energy storage system N83-24974
The characterization of heat storage in confined aquifers with buoyancy flow N83-24975
A comparative study of four major approaches to predicting ATES performance N83-24976
Heat storage in rock: Multiple well system [TULEA-1981:28] N83-25048
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors [DOE/ET-20279/162] N83-25053
Proceedings of the Sixth Annual Thermal and Chemical Storage Contractors' Review Meeting [CONF-810940] N83-25057
Metal hydride/chemical heat pump development project N83-25068
Evaluation of olivine refractories for TES N83-25070
Alternatives to ceramic bricks and ceramic brick systems N83-25071
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Assessment of cool storage in commercial building applications N83-25073

Pelletization and roll encapsulation of phase change materials N83-25074
Effect of additives on performance of hydrated salt TES systems N83-25075
Development of natural stratification technology N83-25076
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080
TES technology transfer in the pulp and paper industry N83-25081
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1668C] N83-25088
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089
Cost and performance of thermal storage concepts in solar thermal systems N83-25090
High temperature active heat exchanger research for latent heat storage N83-25091
High temperature integrated thermal storage for solar thermal applications N83-25092
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview
[DE82-020818] N83-25164

HEAT TRANSFER
A critical review of pulsating combustion
[TAE-468] N83-24576
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048
Chemical heat pump cost effectiveness evaluation N83-25067
Assessment of cool storage in commercial building applications N83-25073
Modeling heat transfer in PCM's with the Budak method N83-25077
Mathematical modeling of TES subsystems N83-25079
High temperature integrated thermal storage for solar thermal applications N83-25092
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155

HEAT TRANSFER COEFFICIENTS
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823

HEAT TRANSMISSION
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023
Modeling heat transfer in PCM's with the Budak method N83-25077
A nonlinear volterra integrodifferential equation occurring in heat flow
[AD-A124349] N83-25448

HEAT TREATMENT
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029

HEATING
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Metal-hydride heat-pump performance studies N83-25069
Pelletization and roll encapsulation of phase change materials N83-25074
Daylight and daylighting laboratory at the Solar Energy Research Institute
[DE82-019255] N83-25135
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195

HEATING EQUIPMENT
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Los Alamos passive test cell results for the 1981-82 winter
[DE83-002948] N83-25129

HEAVY IONS
Science and art in heavy-ion collisions
[DE82-020497] N83-25513
Application of Robertson's collective focusing to final focusing
[DE83-004050] N83-25522
Electron beam probe for charge neutralization studies of heavy ion beams
[LBL-14391] N83-25526
US program in heavy-ion fusion
[DE82-015769] N83-25568

HEAVY NUCLEI
Uranium disequilibrium measurements on groundwaters N83-24945

HEIGHT
Diurnal variability of wind velocity increase with height
[DE83-005804] N83-25336

HELICOPTER ENGINES
NASA transmission research and its probable effects on helicopter transmission design
[NASA-TM-83389] N83-24858

HELICOPTERS
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

HELIOMETERS
Solar radiometers N83-25101

HELIOSPHERE
The structure of the heliospheric current sheet, 1978 - 1982
[NASA-CR-170307] N83-25645

HELIOSTATS
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25128
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192

HELIUM
Compatibility studies of structural alloys with solid breeder N83-24674
Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519

HELIUM ISOTOPES
Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas
[DE82-020163] N83-25578
X-ray-diffraction study of vacancies in bcc helium-3 and bcc helium-4
[DE82-020141] N83-25607

HETEROCYCLIC COMPOUNDS
Bench-scale development of catalysts for reforming aromatic and heterocyclic hydrocarbons
[DE82-015422] N83-24628

HEURISTIC METHODS
Some remarks on the Herlestam-Johannesson algorithm for computing logarithms over GF(2P)
[DE82-020628] N83-25423

HIERARCHIES
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617

HIGH FLUX ISOTOPE REACTORS
HFIR/FFTF irradiation experiment, final design phase N83-24651
Swelling and microstructural development in path A PCA and type 316 stainless steel irradiated in HFIR to about 22 dpa N83-24654
Tensile properties and swelling of 20 percent-cold-worked type 316 stainless steel irradiated in HFIR N83-24656

HIGH PRESSURE
CARS diagnostics of high pressure combustion
[AD-A124304] N83-24584

HIGH PRESSURE OXYGEN
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507

HIGH SPEED
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727

HIGH STRENGTH
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123166] N83-24646

HIGH STRENGTH ALLOYS
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645

HIGH STRENGTH STEELS
Effective use of weld metal yield strength for HY-steels
[AD-A124234] N83-24642
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643

HIGH TEMPERATURE
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645
Thermodynamics of high-temperature brines N83-24982
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Thermodynamic properties of silicate materials N83-24984
Chemistry of nuclear waste substances in aqueous solutions N83-24986
Effects on soils from hot storage tanks N83-25085
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595

HIGH TEMPERATURE GASES
Structural vibration damper for corrosive or high-temperature gaseous environments
[CEGB-TDB-379] N83-24908

HIGH TEMPERATURE PLASMAS
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment --- controlled fusion
[CEA-R-5153] N83-25562
Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas
[DE82-020163] N83-25578

HILBERT SPACE
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues
[INPE-2565-MD/020-PT-2] N83-25613

HISTORIES
Highlights of the history of the lambda-calculus
[AD-A124383] N83-25441
Historical perspective of mass storage
[DE82-018376] N83-25616

HOLES (ELECTRON DEFICIENCIES)
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594

HOMOLOGY
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343

HORIZON SCANNERS
Evaluation of scanning earth sensor mechanism on engineering test satellite 4 N83-24890

HORMONES
Salivary and plasma testosterone and cortisol during moderately heavy excercise
[AD-A122107] N83-25352

HOSES
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518

HOSPITALS
Intermediate photovoltaic system application experiment operational performance report. Volume 4. For G. N. Wilcox Memorial Hospital, Kauai, Hawaii for June, July, and August 1982
[DE83-005380] N83-25174

HOT ELECTRONS
Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569

TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
HOT PRESSING
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
HOT SURFACES
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
HOVERING
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500
HUMAN BEHAVIOR
An assessment of the relationship between the coronary-prone (type A) behavior pattern, stress, and coronary heart disease
[AD-A122809] N83-25358
HUMAN BEINGS
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368
HUMAN FACTORS ENGINEERING
Visual judgments of optical distortions in aircraft windscreens
[AD-A124307] N83-24503
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351
Man-machine cooperation for action planning
[AD-A124243] N83-25373
Organizational context of human factors
[AD-A123435] N83-25374
A digital image processor as a human factors engineering tool
[DE82-015173] N83-25376
HUMAN PERFORMANCE
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357
Sleep loss effects on continuous sustained performance
[AD-A122392] N83-25364
Accuracy and completeness of problem solutions with example-solutions
[AD-A124087] N83-25463
HYBRID PROPELLANTS
Saturation of the lower-hybrid-drift instability by mode coupling
[AD-A123569] N83-25564
HYDRATES
Effect of additives on performance of hydrated salt TES systems N83-25075
Basic chemical studies related to low-temperature thermal-energy storage. Task 1: Thermo-dynamic properties and interactions of salt hydrates used as phase-change materials
[DE82-020826] N83-25162
HYDRATION
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703
HYDRAULIC EQUIPMENT
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625
HYDRAULIC JETS
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732
HYDRAULIC TEST TUNNELS
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803
HYDROBALLISTICS
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538
HYDROCARBON FUELS
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171656] N83-24551
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017041] N83-25179
Heber Known Geothermal Resources Area ethanol-fuel facility
[DE83-004775] N83-25209
HYDROCARBONS
Fuels combustion research
[AD-A123118] N83-24588
Applications of multiproperty analysis in the prediction of complex-system thermophysical behavior
[DE82-020859] N83-24603
Ionic aspects of soot formation
[DE82-020799] N83-24619
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
Bench-scale development of catalysts for reforming aromatic and heterocyclic hydrocarbons
[DE82-015422] N83-24628
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
Laboratory program to support H-coal pilot-plant operations: Volume 2: PDU run 8
[DE82-008213] N83-25187
HYDRODYNAMICS
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403
HYDROELECTRIC POWER STATIONS
Goodyear Lake hydroelectric generating station redevelopment
[DE83-004753] N83-25127
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148
HYDROELECTRICITY
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148
HYDROGEN
Large scale hydrogen-air detonations
[DE82-020353] N83-24722
HYDROGEN COMPOUNDS
Laboratory program to support H-coal pilot-plant operations: Volume 2: PDU run 8
[DE82-008213] N83-25187
Geothermal development plan: Pinal County
[DE83-004879] N83-25205
HYDROGEN EMBRITTLEMENT
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644
HYDROGEN FUELS
Status of the development of solid polymer electrolyte water electrolysis for large scale hydrogen generation N83-25058
Static feed water electrolysis for large scale hydrogen generation N83-25059
Research of advanced electrolytic hydrogen production N83-25061
HYDROGEN ISOTOPES
Reproducibility of an automated laser Raman system for light gas analysis
[MLM-2804] N83-24841
HYDROGEN PRODUCTION
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
Research of advanced electrolytic hydrogen production N83-25061
Recovery of hydrogen from hydrogen sulfide N83-25066
HYDROGEN SULFIDE
Process for practically complete removal of hydrogen sulfide from low-pressure gases
[DE83-005022] N83-24631
Recovery of hydrogen from hydrogen sulfide N83-25066
HYDROGENATION
Continuous chemical-reaction chromatography
[DE82-010447] N83-24594
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
Operation of the Wilsonville Advanced Coal-Liquefaction R and D Facility, Wilsonville, Alabama
[DE83-000110] N83-25133
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602
HYDROGEOLOGY
The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981
Methodology of remote sensing data interpretation and geological applications --- Brazil
[E83-10299] N83-25002
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
HYDROGRAPHY
HHE/LORAN-C surveying
[AD-A124343] N83-24498
HYDROLOGY
Geologic systems as analogs for long-term radioactive waste isolation: Intrusive-rock/country-rock contact zones N83-24934
Coupled hydrologic-thermomechanical experiments for radioactive waste isolation N83-24936
Basis for a tentative thermohydrologic criterion for emplacement density in a nuclear waste repository N83-24938
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
Precipitation Measurements From Space: Workshop report. An element of the climate observing system study
[NASA-TM-85329] N83-25269
Summary of requirements and recommendations N83-25270
Agricultural requirements for precipitation measurements N83-25279
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530
HYDROLYSIS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
HYDROMETEOROLOGY
Use of combined radar and radiometer systems in space for precipitation measurement: Some ideas N83-25312
HYDROPYROLYSIS
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
HYDROSTATIC PRESSURE
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
HYDROTHERMAL SYSTEMS
Low- to moderate-temperature hydrothermal reservoir engineering research N83-24965
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
Generic studies of geothermal reservoir behavior N83-24970
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023
Low-to-moderate-temperature hydrothermal reservoir engineering handbook
[DE82-016282] N83-25149
HYPERBOLAS
A study of dynamic energy equations for Stirling cycle analysis
[NASA-CR-168152] N83-25043
HYPERSONIC SPEED
Development of the flow field in streamwise corners at hypersonic speeds and effects of the corner flow on downstream fitted flaps
[ESA-TT-583] N83-24480
HYSTERESIS
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520

I

ICE FORMATION
Experimental comparison of icing cloud instruments
[NASA-TM-83340] N83-24487

IDAHO
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
IDENTIFYING
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
IGNEOUS ROCKS
Theoretical model of fluid flow through a deformable rock fracture N83-24939
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Rod-type extensometers in long-term elevated temperature service N83-24953
Geophysical borehole measurements in low-permeability rock N83-24955
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
IGNITION
Effects of preignition on pulverized-coal combustion
[DE82-020517] N83-24599
Autoignition of kerosene in fluidized-bed pilot-plant calciners
[DE82-008764] N83-24610
Projectile impact ignition characteristics of propellants
[AD-A122944] N83-24715
IGNITION TEMPERATURE
Autoignition of kerosene in fluidized-bed pilot-plant calciners
[DE82-008764] N83-24610
ILLUMINATING
Predicting energy savings attributed to daylighting
[DE82-022038] N83-25134
Daylight and daylighting laboratory at the Solar Energy Research Institutue
[DE82-019255] N83-25135
ILLUSIONS
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353
IMAGE ANALYSIS
Vegetation and terrain effects on digital classification of LANDSAT imagery
[AD-A124236] N83-25009
IMAGE ENHANCEMENT
Amtospheric correction analysis on LANDSAT data over the Amazon region --- Manaus, Brazil
[E83-10298] N83-25001
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
IMAGE FILTERS
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
IMAGE INTENSIFIERS
Low light level imaging design
[AD-A124283] N83-25547
IMAGE PROCESSING
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
Feature component reduction through divergence analysis
[AD-A123474] N83-25007
Scene classification results using the max-min texture measure
[AD-A123496] N83-25009
Temporal image normalization
[AD-A123313] N83-25010
A digital image processor as a human factors engineering tool
[DE82-015173] N83-25376
Development of translational image registration techniques
[INPE-2634-RPE-427] N83-25389
Grid-based line drawing quantization
[AD-A124692] N83-25405
Programmable Image Processing Element (PIPE)
[AD-A123443] N83-25412
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques
[INPE-2710-PRE/298] N83-25437
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
IMAGE RECONSTRUCTION
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545
IMAGE RESOLUTION
LANDSAT-4 image data quality analysis for energy related applications --- nuclear power plant sites
[E83-10295] N83-24998
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques
[INPE-2710-PRE/298] N83-25437
IMAGES
Scene classification results using the max-min texture measure
[AD-A123496] N83-25008
IMAGING TECHNIQUES
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
IMPACT DAMAGE
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732
IMPACT LOADS
Projectile impact ignition characteristics of propellants
[AD-A122944] N83-24715
Mallet impact test
[DE83-001841] N83-24718
IMPACT TESTS
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538
Impact damage of composite plates
[NASA-CR-170309] N83-24558
Failure mechanics in low-velocity impacts on thin composite plates
[NASA-TP-2152] N83-24562
IMPEDANCE
Impedance and current of insulated and end-grounded linear antennas in seawater
[AD-A123345] N83-24751
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263
IMPERIAL VALLEY (CA)
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California
[NASA-TM-84317] N83-25003
IMPINGEMENT
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
IMPURITIES
Role of impurities in silicon solar cell performance N83-25099
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
Study of impurities in the tandem mirror experiment using extreme-ultraviolet spectroscopy
[DE82-020610] N83-25582
INCOMPRESSIBLE FLOW
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476
INCOMPRESSIBLE FLUIDS
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
INDEPENDENT VARIABLES
A FORTRAN program for isotonic regression in two independent variables
[AD-A123510] N83-25397
INDEXES (DOCUMENTATION)
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
INDIUM PHOSPHATES
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590
INDIUM PHOSPHIDES
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586
INDOOR AIR POLLUTION
Exclusion-list methodology for weatherization program in the Pacific Northwest
[DE83-004051] N83-25234
INDUCTANCE
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848
INDUCTION MOTORS
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768
INDUSTRIAL ENERGY
Feasibility case study of gas-turbine direct-heat industrial cogeneration
[DE83-005655] N83-25126
INDUSTRIAL WASTES
Metal hydride process for hydrogen recovery N83-25065
INDUSTRIES
Evaluation of dual-energy-use systems. Volume 1: Executive summary
[DE83-900758] N83-25198
INELASTIC SCATTERING
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508
INELASTIC STRESS
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913
INERTIAL CONFINEMENT FUSION
Electron beam probe for charge neutralization studies of heavy ion beams
[LBL-14391] N83-25526
INFERENCE
A FORTRAN program for the level probabilities of order restricted inference
[AD-A123511] N83-25477
INFORMATION DISSEMINATION
Coal-Gasification Modeling Workshop Proceedings
[DE82-017279] N83-25186
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
Agricultural requirements for precipitation measurements N83-25279
INFORMATION SYSTEMS
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617
SLATEC common mathematical library source file format
[DE83-005812] N83-25619
INFORMATION THEORY
Alternatives to optimal detection
[AD-A123454] N83-24760
INFRARED DETECTORS
Infrared satellite technology study
[AD-A123631] N83-24536
INFRARED IMAGERY
A life history method for estimating convective rainfall N83-25293
A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295
INFRARED RADIATION
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578
Visible and infrared techniques N83-25273
Precipitation measurement requirements for general circulation climate model development and applications N83-25277
The Bristol method of satellite-improved rainfall monitoring N83-25297
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538
INFRARED RADIOMETERS
Combined spaceborne and conventional measurements for precipitation estimation N83-25300
INFRARED SIGNATURES
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements --- Kansas and Indiana
[E83-10293] N83-24996
INFRARED SPECTRA
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253
INFRARED TELESCOPES
Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24888

INGOTS
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon slicing by fixed abrasive slicing technique N83-25030

INHIBITORS
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703

INLET FLOW
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine
[NASA-TM-83359] N83-24505

INPUT/OUTPUT ROUTINES
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4
[AD-A123307] N83-25406

INSOLATION
Summary of solar irradiance data sessions N83-25100
Catalog of automatic Sun-following trackers --- for monitoring solar radiation and alignment of solar collectors
[DE83-005529] N83-25178
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202

INSTRUMENT ERRORS
Validation diagnostics for defective thermocouple circuits
[DE82-012778] N83-24787

INSTRUMENT LANDING SYSTEMS
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna
[DOT/FAA/PM-83/18] N83-24492

INSULATION
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083

INSULATORS
Pyroelectric detector arrays
[NASA-CASE-LAR-12363-2] N83-24763
Bonded stacked-ring insulator for the Antares electron gun
[DE82-017586] N83-24851

INTAKE SYSTEMS
A critical review of pulsating combustion
[TAE-468] N83-24576

INTEGRAL EQUATIONS
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469

INTEGRALS
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958

INTEGRATED CIRCUITS
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
MISE: Machine for In-System Evaluation of custom VLSI chips
[AD-A123334] N83-24773
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774
Advanced electronic technology
[AD-A123581] N83-24779
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039
The use of test structures for reliability prediction and process control of integrated circuits and photovoltaics N83-25096
Computational geometry on a systolic chip
[AD-A123362] N83-25382
Programmable Image Processing Element (PIPE)
[AD-A123443] N83-25412
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493

INTERACTIVE CONTROL
Using a batch processor to create an interactive menu-driven operating system
[LA-9205-MS] N83-25381
Resource allocation: COPLAN/RAM system user's manual
[INPE-2614-NTE/196] N83-25391
An interactive system for project control and planning
[INPE-2620-TDL/107] N83-25614

INTERFACE STABILITY
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867

INTERFACES
Structure of Surfaces of Interfaces
[DE82-019302] N83-25606
An interactive system for project control and planning
[INPE-2620-TDL/107] N83-25614

INTERFACIAL ENERGY
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645

INTERFACIAL TENSION
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813

INTERFEROMETERS
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545

INTERGRANULAR CORROSION
Electrochemical aspects of stress-corrosion cracking of sensitized stainless steels
[DE82-020003] N83-24688

INTERLAYERS
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638

INTERMETALLICS
Improved nickel base coating alloy --- oxidation resistant coatings
[NASA-CASE-LEW-13834-1] N83-24639

INTERNAL COMBUSTION ENGINES
Calculations and measurements of the flow in a motored model engine and implications for open-chamber direct-injection engines
[DE83-019033] N83-24868

INTERNAL FRICTION
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks
[NASA-TM-82520] N83-24553

INTERNAL PRESSURE
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240

INTERNATIONAL COOPERATION
Overview of the Mexican-American cooperative program at the Cerro Prieto geothermal field N83-24977

INTERPLANETARY SPACE
Interplanetary magnetic field and tropospheric circulation
[NASA-CR-170277] N83-25251

INTERPOLATION
A method for interpolating in Bondarenko factor tables and other functions
[DE82-015685] N83-25470

INTERSTELLAR GAS
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630

INTRUSION
Geologic systems as analogs for long-term radioactive waste isolation: Intrusive-rock/country-rock contact zones N83-24934

INVENTORIES
Fusion program research materials inventory N83-24670

INVERSE SCATTERING
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766

INVERTERS
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169

INVISCID FLOW
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24808
Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
Green's functions at zero viscosity
[DE83-004528] N83-25475

IODINE
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
The sulfur-iodine thermochemical water-splitting cycle N83-25082

ION BEAMS
Microspectroscopy
[DE82-020158] N83-24614
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640
Electron beam probe for charge neutralization studies of heavy ion beams
[LBL-14391] N83-25526

ION CURRENTS
Ceramic-metal solid electrolytes
[DE82-009034] N83-24591

ION EXCHANGE RESINS
Radiolytic effects on ion exchangers during the storage of radioactive wastes
[DE82-019551] N83-25533

ION EXCHANGING
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes
[DE83-005635] N83-25536

ION IMPLANTATION
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595

ION PROBES
Miniaturized multisensor probes based on coated wire ion selective electrodes
[AD-A123415] N83-24837

ION SCATTERING
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577

ION SELECTIVE ELECTRODES
Miniaturized multisensor probes based on coated wire ion selective electrodes
[AD-A123415] N83-24837
Field method for sulfide determination
[DE82-017044] N83-25227

ION STRIPPING
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580

IONIC COLLISIONS
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509
Science and art in heavy-ion collisions
[DE82-020497] N83-25513

IONIC REACTIONS
Production and reactions of negative ions
[DE82-020824] N83-25520

IONIZATION
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509
Collisionally excited few-electron systems: Theoretical introduction and survey
[DE82-020805] N83-25516
Production and reactions of negative ions
[DE82-020824] N83-25520
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641
IONOSPHERIC PROPAGATION
ULF near fields in layered media
[AD-A123669] N83-24747
IONS
Applications of ion chromatography
[DE83-004942] N83-24632
IRIDIUM
Welding iridium heat-source capsules for space missions
[DE82-020098] N83-24865
IRON
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602
IRON ALLOYS
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
The ductility behavior of irradiated path alloys N83-24658
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Iron-nickel alloys as canister material for radioactive waste disposal in underground repositories N83-24935
Research, development, and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021266] N83-25137
IRON OXIDES
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
IRRADIANCE
Summary of solar irradiance data sessions N83-25100
IRRADIATION
Alloy development for irradiation performance
[DE83-006357] N83-24648
Neutronics calculations in support of the ORR-MFE-4 spectral tailoring experiments N83-24652
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel
[DE82-020501] N83-24683
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
Study of behavioral modifications resulting from exposure to high let radiation
[NASA-CR-171651] N83-25350
IRREVERSIBLE PROCESSES
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
Energy-release rate associated with diffusional crack growth
[DE83-005564] N83-24915
IRRIGATION
Wind-assist irrigation and electrical-power generation
[DE83-900882] N83-25212
ISENTROPIC PROCESSES
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643
ISOLATION
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343
ISOMERS
Novel mesogenic polysiloxane solvents for gas-liquid chromatography
[DE82-020753] N83-24613
ISOTHERMAL PROCESSES
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
ISOTOPES
Isotope-dilution analyses of the metallic elements
[DE83-004924] N83-24692
ISOTOPIC LABELING
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
ITERATIVE SOLUTION
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432

J

JACOBI MATRIX METHOD
Software for estimating sparse Jacobian matrices
[DE82-021234] N83-25421
JAMMING
A robust ratio-threshold technique to mitigate tone and partial band jamming in coded frequency hopped communication links
[AD-A123559] N83-24753
JET AIRCRAFT NOISE
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496
JET ENGINES
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511
A finite element computation of the electromagnetic fields within an engine inlet model
[AD-A124684] N83-24752
Analysis of strain gage reliability in F-100 jet engine testing at NASA Lewis Research Center N83-24829
JET IMPINGEMENT
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
JETTISON SYSTEMS
The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899
JOINTS (JUNCTIONS)
Integrated methodology for adhesive bonded joint life predictions
[AD-A124324] N83-24701
Design and fabrication of realistic adhesively bonded joints
[NASA-CR-166099] N83-24876
The Stiffness of Joints
[TULEA-1981:22] N83-25241
JOURNAL BEARINGS
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857
Vapor cavitation in dynamically loaded journal bearings
[NASA-TM-83366] N83-24875
JUDGMENTS
The perception of objects and their functional uses
[AD-A122797] N83-25370
JUNCTIONS
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks
[NASA-TM-82520] N83-24553
JUPITER (PLANET)
Research in planetary astronomy and operation of Mauna Kea Observatory
[NASA-CR-170246] N83-25631
JUPITER ATMOSPHERE
Fine-scale structure of the Jovian magnetotail current sheet
[NASA-TM-85014] N83-25639

K

KALMAN FILTERS
Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386
KEROGEN
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
KEROSENE
Autoignition of kerosene in fluidized-bed pilot-plant calciners
[DE82-008764] N83-24610
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170280] N83-24711
KINETIC ENERGY
Severe storms requirements for precipitation information N83-25281
KRYPTON
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
KRYPTON FLUORIDE LASERS
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848
KRYPTON 85
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260

L

LABYRINTH SEALS
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163
LAKES
Acid rain: A background report
[DE83-901079] N83-25236
LAMINAR BOUNDARY LAYER
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
LAMINAR FLOW
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821
LAMINATES
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019108] N83-24588
Channel plating
[DE82-021687] N83-24788
Design and development of a laminated Fresnel lens for point-focus PV systems, phase 2
[DE83-005935] N83-25560
LAND MANAGEMENT
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
LAND USE
Application of remote sensing to urban studies
[INPE-2625-NTE/197] N83-25004
Land use/mineral rights map series
[DE83-901050] N83-25012
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho
[E83-10289] N83-25024
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Lessening the scope of federal coastal zone management: What's at stake
[DE83-004048] N83-25233
Protecting wind access: A preliminary assessment
[DE82-019128] N83-25333
LANDING AIDS
Evaluation of Precision Approach Path Indicator (PAPI)
[FAA-CT-82-153] N83-24495
LANDSAT SATELLITES
LANDSAT-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska
[AD-A123440] N83-25011
Appraisal of LANDSAT lineaments as faults in Western Kentucky
[DE83-005412] N83-25019
Structural geology of the Moorman syncline area of western Kentucky
[DE82-022305] N83-25258
LANDSAT 4
AN-A46. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997
LANDSLIDES
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240
LANTHANUM COMPOUNDS
Stabilized lanthanum sulphur compounds --- thermoelectric materials
[NASA-CASE-NPO-16135-1] N83-24572

LARGE SCALE INTEGRATION
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit
[NASA-CASE-NPO-16021-1] N83-24769
LARGE SPACE STRUCTURES
Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(07)] N83-24525
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 1: Executive summary
[NASA-CR-171661] N83-24526
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527
On parameter identification for large space structures
[NASA-CR-170306] N83-24543
ACOSS-16 (Active Control of Space Structures)
[AD-A123540] N83-24546
ACOSS fifteen (Active Control of Space Structures)
[AD-A123530] N83-24547
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545
LARGE SPACE TELESCOPE
Space telescope: Solar array primary deployment mechanism N83-24884
LASER APPLICATIONS
Microspectroscopy
[DE82-020158] N83-24614
LASER FUSION
Nonuniformities in laser-ablated plasma
[AD-A123643] N83-24844
Increasing the effective bandwidth of a laser-fusion —driver
[DE82-015170] N83-24847
Optical components for the Nova laser
[DE82-017294] N83-24850
LASER MATERIALS
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence — for laser devices
[AD-A124300] N83-24582
Oxide and halide laser glasses
[DE82-020162] N83-24854
LASER OUTPUTS
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559
LASER SPECTROSCOPY
Laser spectroscopy of combustion intermediates
[DE83-004869] N83-24590
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515
LASER TARGETS
Nonuniformities in laser-ablated plasma
[AD-A123643] N83-24844
Increasing the effective bandwidth of a laser-fusion driver
[DE82-015170] N83-24847
LASER WELDING
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
LASERS
Reading and writing of photochemical holes using GaAlAs diode lasers
[AD-A124633] N83-24846
Unique developments in Laser-Induced Fluorescence Fluorimetry (LIFF) N83-24992
Ocular thermal injury from intense light
[AD-A122226] N83-25366
Theory and simulation of laser plasma coupling, 2
[DE82-020350] N83-25580
LATCH-UP
Microcircuit radiation effects databank
[NASA-TM-85328] N83-24771
LATCHES
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
Latch fittings for the scientific instruments on the space telescope N83-24898
Hinge latch mechanism N83-24904
LATTICE PARAMETERS
X-ray-diffraction study of vacancies in bcc helium-3 and bcc helium-4
[DE82-020141] N83-25607
LEAD ACID BATTERIES
Report for 1981 on research, development and demonstration of nickel-zinc batteries for electric vehicle propulsion
[ANL/OPEM-81-12] N83-25045
LEAD ALLOYS
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
LEAD COMPOUNDS
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836
LEADING EDGES
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479
LEAKAGE
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
LEARNING
Forms of understanding in mathematical problem solving
[AD-A123384] N83-25454
LEAST SQUARES METHOD
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263
FITS: A function-fitting program
[LA-9111-M] N83-25393
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431
Robust regression: A diagnostic tool
[AD-A123651] N83-25481
LEBESGUE THEOREM
Mean values of subsolutions of elliptic and parabolic equations
[AD-A124355] N83-25449
LENS DESIGN
Design and development of a laminated Fresnel lens for point-focus PV systems, phase 2
[DE83-005935] N83-25560
LENSES
Quasi-optic studies of dielectric radomes and lenses
[AD-A124371] N83-24761
LEVITATION
Gas levitator having fixed levitation node for containerless processing
[NASA-CASE-MFS-25509-1] N83-24828
LEWIS BASE
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
LIFE (DURABILITY)
Integrated methodology for adhesive bonded joint life predictions
[AD-A124324] N83-24701
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers
[AD-A123178] N83-24845
Cycle life test and failure model of nickel-hydrogen cells
[NASA-TM-83375] N83-25038
LIFE CYCLE COSTS
Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146
LIFT
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
LIGANDS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
LIGHT (VISIBLE RADIATION)
Visible and infrared techniques N83-25273
Ocular thermal injury from intense light
[AD-A122226] N83-25366
LIGHT SCATTERING
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559
LIGHT SOURCES
Photovoltaic measurement equipment needs. View of a prospective supplier N83-25094
LIGHT TRANSMISSION
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres
[AD-A123396] N83-25257
LIGHT WATER REACTORS
Steam-turbine-disc cracking experience. Volume 2: Data summaries and discussion
[DE82-005834] N83-24918
LIGHTING EQUIPMENT
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
LIGNITE
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite
[DE82-020853] N83-24615
LIMESTONE
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite
[DE82-020853] N83-24615
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020
LINE OF SIGHT
The distributions of measures of visibility on line segments in three dimensional spaces under Poisson shadowing processes
[AD-A123183] N83-25458
LINE SPECTRA
Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas
[DE82-020163] N83-25578
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
Ultraviolet lines from emission line giants
[INPE-2690-PRE/289] N83-25633
Electron densities in a solar flare derived from X-ray spectra
[AD-A111360] N83-25647
LINEAR ARRAYS
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545
LINEAR SYSTEMS
Synchronizing large systolic arrays
[AD-A123374] N83-24780
Adjustment of design parameters for improved feedback properties in the linear quadratic regulator
[AD-A124494] N83-24782
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
LINEARITY
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
LINGUISTICS
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493
LINKAGES
Hinge latch mechanism N83-24904
LIQUEFIED GASES
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714
LIQUID CHROMATOGRAPHY
Program WINDOW
[DE82-020760] N83-24611
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE82-012255] N83-24624
Miniaturized multisensor probes based on coated wire ion selective electrodes
[AD-A123415] N83-24837
LIQUID COOLING
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163
LIQUID FUELS
Experimental design of an interlaboratory study for trace metal analysis of liquid fluids — for aerospace vehicles
[NASA-TP-2148] N83-24575
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
LIQUID HELIUM
Liquid helium management for Gravity Probe-B
[NASA-TM-82521] N83-24830
Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25589

LIQUID HYDROGEN
Study on sealing characteristics of high speed, face-contact bellows mechanical seals for liquid hydrogen
[NAL-TR-750] N83-24861
Rolling beam umbilical system N83-24900
LIQUID INJECTION
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
LIQUID METALS
Artery heat pipes for space-power systems
[DE82-015445] N83-24822
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
LIQUID NITROGEN
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
LIQUID OXYGEN
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171656] N83-24551
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191
LIQUID PHASE EPITAXY
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence — for laser devices
[AD-A124300] N83-24582
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596
LIQUID PHASES
The bidimensional Stefan problem with convection: The time-dependent case
[AD-A124377] N83-24810
LIQUID ROCKET PROPELLANTS
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507
LIQUID WASTES
Ultrafiltration/reverse osmosis (liquid treatment systems)
[DE82-020775] N83-24607
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982
[DE82-016255] N83-25532
Disposal of liquid radioactive wastes through wells or shafts
[DE82-008944] N83-25534
LIQUID-SOLID INTERFACES
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
LIQUID-VAPOR INTERFACES
Lubricant foaming and aeration study
[AD-A124184] N83-24696
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
LIQUIDS
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Thermodynamic properties of silicate materials N83-24984
Effects on soils from hot storage tanks N83-25085
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
Crystal growth in substrate-confined liquids
[AD-A123386] N83-25599
LITHIUM
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Environmental effects on properties of structural alloys N83-24672
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
Advanced-fuel-cell development
[DE82-021146] N83-25131
Optical properties related to electrical switching of Li doped NiO crystals
[AD-A124299] N83-25591
LITHIUM ALUMINUM HYDRIDES
Advanced-fuel-cell development
[DE82-021272] N83-25136
LITHOGRAPHY
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931
LITHOLOGY
Geologic setting of the Georges Bank Basin N83-24923
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924
The Baca demonstration project N83-24967
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261
LITHOSPHERE
Study of the time evolution of the lithosphere
[NASA-CR-170337] N83-25238
LIVESTOCK
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
LOADING RATE
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
LOADS (FORCES)
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020639] N83-25159
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240
The Stiffness of Joints
[TULEA-1981:22] N83-25241
LOGARITHMS
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395
Some remarks on the Herlestam-Johannesson algorithm for computing logarithms over GF(2P)
[DE82-020628] N83-25423
LOGIC CIRCUITS
Capacity selector value electronics enclosure assembly controller card assembly test specifications
[AD-A123539] N83-24772
Programmable Image Processing Element (PIPE)
[AD-A123443] N83-25412
LONG TERM EFFECTS
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Propellant/material compatibility program and results: Ten-year milestones
[NASA-CR-170346] N83-24710
Energy sources and climate
[DE82-020612] N83-25334
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530
LONG WAVE RADIATION
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005
LONGERONS
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
LORAN
HHE/LORAN-C surveying
[AD-A124343] N83-24498
LORAN C
Alaska Loran-C flight test evaluation
[FAA-PM-83-4] N83-24491
LORENTZ FORCE
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576
LOW GRAVITY MANUFACTURING
Gas levitator having fixed levitation node for containerless processing
[NASA-CASE-MFS-25509-1] N83-24828
LOW PRESSURE
Process for practically complete removal of hydrogen sulfide from low-pressure gases
[DE83-005022] N83-24831
LOW SPEED
Failure mechanics in low-velocity impacts on thin composite plates
[NASA-TP-2152] N83-24562
LOW TEMPERATURE
Basic chemical studies related to low-temperature thermal-energy storage. Task 1: Thermo-dynamic properties and interactions of salt hydrates used as phase-change materials
[DE82-020826] N83-25162
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
LOW THRUST
Effects of small thrust on the motion of an artificial Earth satellite
[NAL-TR-744] N83-24533
LUBRICANTS
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
Lubricant foaming and aeration study
[AD-A124184] N83-24696
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862
LUBRICATING OILS
Considerations on the lubrication of spacecraft mechanisms N83-24883
LUBRICATION
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
LUMINAIRES
Automation of the DMA list of lights and radio navigational aids
[AD-A124199] N83-24496
LUMINANCE
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
LUMINESCENCE
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609
LUMINOUS INTENSITY
Low light level imaging design
[AD-A124283] N83-25547
LUNAR ROCKS
Mineralogy and chemistry of planets and meteorites
[NASA-CR-170345] N83-25637

M

MACHINING
High-speed machining of Space Shuttle External Tank (ET) panels
[NASA-CR-170751] N83-24537
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727
Cutting-fluid conservation
[DE82-009655] N83-24734
MAGMA
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638
MAGNESIUM COMPOUNDS
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020
MAGNET COILS
High-field superconducting accelerator magnets
[DE82-020517] N83-25495
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585
MAGNETIC ANOMALIES
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
MAGNETIC CORES
H5 fast-kicker-magnet pulser
[DE82-020002] N83-24790
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576
MAGNETIC DIPOLES
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576
MAGNETIC DISKS
Floppy-disk system for punched-tape reader emulation
[DE82-021126] N83-25385
MAGNETIC DOMAINS
Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551
MAGNETIC FIELDS
Interplanetary magnetic field and tropospheric circulation
[NASA-CR-170277] N83-25251
Biological effects of static magnetic fields: A selective review with emphasis on risk assessment
[DE82-013350] N83-25367

Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576
The structure of the heliospheric current sheet, 1978 - 1982
[NASA-CR-170307] N83-25645

MAGNETIC LENSES
A hybrid charged-particle guide for studying (n, charged particle) reactions
[DE82-020664] N83-25512

MAGNETIC MIRRORS
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors
[DE82-020283] N83-25581
Study of impurities in the tandem mirror experiment using extreme-ultraviolet spectroscopy
[DE82-020610] N83-25582

MAGNETIC MONOPOLES
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583

MAGNETIC STORMS
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249

MAGNETIC SURVEYS
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Simple one-dimensional inversions of magnetotelluric data N83-24962
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data
[DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017

MAGNETIC TAPES
Floppy-disk system for punched-tape reader emulation
[DE82-021126] N83-25385

MAGNETITE
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions
[DE83-900751] N83-24616

MAGNETIZATION
Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610

MAGNETOHYDRODYNAMIC FLOW
Neoclassical flows and transport in nonaxisymmetric toroidal plasmas
[DE82-021691] N83-25574
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars
[REPT-723] N83-25627

MAGNETOHYDRODYNAMIC STABILITY
Simulation of plasma double-layer structures
[NASA-CR-170279] N83-25563
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566
Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors
[DE82-020283] N83-25581

MAGNETOMETERS
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
Deep electromagnetic sounding in the Basin and Range Province N83-24961

MAGNETRON SPUTTERING
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering --- selective absorber coatings of alumina-metal-alumina
[DE83-005692] N83-24687

MAINTAINABILITY
Reliability and availability evaluation program manual
[AD-A124294] N83-24869

MAINTENANCE
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
Methyl methacylate polymer-concrete for bomb damage repair
[AD-A123346] N83-24699
What is a Software Engineering Environment (SEE)? Desired characteristics
[AD-A124280] N83-25396

MALES
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351

MAN MACHINE SYSTEMS
Man-machine cooperation for action planning
[AD-A124243] N83-25373

MANAGEMENT INFORMATION SYSTEMS
Man-machine cooperation for action planning
[AD-A124243] N83-25373

MANAGEMENT METHODS
Community energy management: An annotated bibliography
[ANL/CNSV-29] N83-25046
Multi-dimensional program management
[AD-A123635] N83-25615

MANAGEMENT PLANNING
Man-machine cooperation for action planning
[AD-A124243] N83-25373
An interactive system for project control and planning
[INPE-2620-TDL/107] N83-25614
National Aeronautics and Space Administration Authorization Act, 1983 N83-25623

MANEUVERABILITY
The manned maneuvering unit flight controller arm N83-24897

MANEUVERABLE REENTRY BODIES
Advances in techniques for tracking and terminal state estimation of a goal seeking vehicle (The Target RV) via an optimal BMD intercept vehicle filter
[AD-A124628] N83-24548

MANGANESE
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C)
[NASA-TM-83355] N83-24638

MANNED SPACE FLIGHT
Space Physiology and Medicine
[NASA-SP-447] N83-25349

MAPPING
LANDSAT-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska
[AD-A123440] N83-25011
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395

MAPS
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617

MARINE BIOLOGY
Tropic interactions of the sea nettle, Chrysaora quinquecirrha
[TR-82-2] N83-25338

MARINE ENVIRONMENTS
Tropic interactions of the sea nettle, Chrysaora quinquecirrha
[TR-82-2] N83-25338

MARINE METEOROLOGY
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246

MARKET RESEARCH
The return of the propeller airplane
[SNIAS-822-111-102] N83-24501

MARKETING
Geothermal development plan: Pima County
[DE83-004877] N83-25120
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148

MARKOV CHAINS
Generating parallel correlated transition frequencies for a Markov chain
[AD-A124250] N83-25478
Superefficient simulation of Markov chains and semi-Markov processes
[AD-A124252] N83-25480

MARS PHOTOGRAPHS
A Catalog of Selected Viking Orbiter Images
[NASA-RP-1093] N83-25636

MARTENSITIC STAINLESS STEELS
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663

MASS
Continuum modeling of two-phase flows
[AD-A124385] N83-24812
Massive or weighty problem of atomic weight: It's a dimensionless dilemma
[DE82-020741] N83-25510

MASS DISTRIBUTION
A standard verification for rainfall estimation from remote platforms N83-25288
A survey of radar rain measurement techniques N83-25290

MASS FLOW
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264

MASS FLOW FACTORS
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712

MASS SPECTROSCOPY
Isotope-dilution analyses of the metallic elements
[DE83-004924] N83-24692

MASS TRANSFER
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors
[DE82-014980] N83-24825
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985

MATERIALS HANDLING
Silicon slicing by fixed abrasive slicing technique N83-25030
The information data bases at the Transportation Technology Center
[DE82-011468] N83-25626

MATERIALS RECOVERY
Uranium from seawater
[DE83-000658] N83-24595
Process for practically complete removal of hydrogen sulfide from low-pressure gases
[DE83-005022] N83-24631
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
Central Arkansas Energy Project. Coal to medium-Btu gas
[DE82-017577] N83-25184
A decision making model for the recovery of useful material resources from wastes
[DE82-019204] N83-25620

MATERIALS TESTS
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911

MATHEMATICAL LOGIC
Simple one-dimensional inversions of magnetotelluric data N83-24962

MATHEMATICAL MODELS
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems
[DE82-021685] N83-24762
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795
Computer modeling of heat pipe performance
[NASA-CR-171641] N83-24806
Verification and improvement of a predictive model for radionuclide migration N83-24944
Uranium (VI) retardation mechanisms N83-24946
Low- to moderate-temperature hydrothermal reservoir engineering research N83-24965
Modeling of fracture reservoirs N83-24969
Mine ventilation planning: A case study N83-24990
Mathematical modeling of TES subsystems N83-25079

Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146
Estimating a family of distributions with applications to the extension of climatology
[AD-A123385] N83-25328
A model for on-offshore sediment transport in the surfzone
[AD-A124235] N83-25340
Software reliability modelling and estimation techniques
[AD-A123421] N83-25414
ABAQUS-EPGEN: A general-purpose finite-element code. Volume 1: User's manual
[DE83-900754] N83-25418
A mushy zone model with an exact solution
[ORNL/CSD-91] N83-25435
Theoretical method for calculating relative joint geometry of assembled robot arms
[NASA-TP-2155] N83-25438
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462
Reverberation research overview
[AD-A123351] N83-25501
Dynamic behavior of particulate viscoelastic composites for sound absorption
[AD-A124272] N83-25502
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
Natural Poisson structures of nonlinear plasma dynamics
[DE82-019299] N83-25572
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583

MATHEMATICAL PROGRAMMING
Hidden line elimination in projected grid surfaces
[AD-A124348] N83-25447
SLATEC common mathematical library source file format
[DE83-005812] N83-25619

MATRICES (MATHEMATICS)
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide
[NASA-CR-166063] N83-24544
Sparse matrix methods in optimization
[AD-A124397] N83-25442
Asymptotic spectral analysis of cross-product matrices
[AD-A123438] N83-25465
LU decompositions of generalized diagonally dominant matrices
[ORNL/CSD-98] N83-25491
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues
[INPE-2565-MD/020-PT-2] N83-25613

MAXIMUM LIKELIHOOD ESTIMATES
On parameter identification for large space structures
[NASA-CR-170306] N83-24543
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745

MAXWELL EQUATION
Simple one-dimensional inversions of magnetotelluric data N83-24962

MEAN
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479

MEASURING INSTRUMENTS
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Photovoltaic measurement equipment needs. View of a supplier N83-25095
Results of solar testing of circular foil heat-flux sensors at the White Sands solar furnace
[DE82-006282] N83-25142
Precipitation Measurements From Space: Workshop report. An element of the climate observing system study
[NASA-TM-85329] N83-25269

MECHANICAL DRIVES
Evaluation of scanning earth sensor mechanism on engineering test satellite 4 N83-24890

MECHANICAL PROPERTIES
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C)
[NASA-TM-83355] N83-24638
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields
[DE82-904603] N83-24690
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703
On the effects of spherical fillers or the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
Crystallinity as a selection criterion for engineering properties of high-density polyethylene
[DE82-020496] N83-24706
Testing and validation of the Purdue Physical Properties Package (PPROP) Code
[DE82-007727] N83-24724
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design
[AD-A119497] N83-24880
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
Development of a coupled thermal-hydraulic-mechanical finite-element model for saturated fractured porous media N83-24942
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
Effects on soils from hot storage tanks N83-25085
Study of the time evolution of the lithosphere
[NASA-CR-170337] N83-25238

MEDIA
ULF near fields in layered media
[AD-A123669] N83-24747

MEDICAL EQUIPMENT
System and method for moving a probe to follow movements of tissue
[NASA-CASE-NPO-15197-1] N83-25346

MELTING
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
Modeling of nuclear waste disposal by rock melting
[DE82-012798] N83-25535

MELTING POINTS
Modeling heat transfer in PCM's with the Budak method N83-25077
Mathematical modeling of TES subsystems N83-25079
Advanced high-temperature thermal energy storage media for industrial applications N83-25082

MELTS (CRYSTAL GROWTH)
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033

MEMBRANE STRUCTURES
Improved field performance for reverse osmosis systems
[AD-A124244] N83-24579

MEMBRANES
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982
[DE82-016255] N83-25532
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes
[DE83-005635] N83-25536

MESH
Calculation of transonic potential flow around a wing-body-tail combination
[AD-A124247] N83-24482

MESOSCALE PHENOMENA
AVE/VAS 4: 25-mb sounding data
[NASA-CR-170739] N83-25266
AVE/VAS 5: 25-mb sounding data
[NASA-CR-170740] N83-25267
Evaluation of the synoptic and mesoscale predictive capabilities of a mesoscale atmospheric simulation system
[NASA-TM-84995] N83-25317

MESSAGE PROCESSING
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4
[AD-A123307] N83-25406
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1
[AD-A123304] N83-25407
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2
[AD-A123305] N83-25408
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3
[AD-A123306] N83-25409

METAL BONDING
Design and fabrication of realistic adhesively bonded joints
[NASA-CR-166099] N83-24876

METAL COATINGS
Improved nickel base coating alloy --- oxidation resistant coatings
[NASA-CASE-LEW-13834-1] N83-24639

METAL FATIGUE
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647

METAL HYDRIDES
Metal hydride process for hydrogen recovery N83-25065
Metal hydride/chemical heat pump development project N83-25068
Metal-hydride heat-pump performance studies N83-25069
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602

METAL JOINTS
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703

METAL OXIDE SEMICONDUCTORS
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600

METAL SHEETS
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering --- selective absorber coatings of alumina-metal-alumina
[DE83-005692] N83-24687

METAL STRIPS
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering --- selective absorber coatings of alumina-metal-alumina
[DE83-005692] N83-24687

METAL-METAL BONDING
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703

METAL-NITRIDE-OXIDE-SILICON
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775

METALLIC GLASSES
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700

METALS
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
Isotope-dilution analyses of the metallic elements
[DE83-004924] N83-24692
Structure of large-angle grain boundaries in metals and ceramic oxides
[DE82-022006] N83-25608

METASTABLE STATE
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836
METEORITIC COMPOSITION
Mineralogy and chemistry of planets and meteorites
[NASA-CR-170345] N83-25637
METEOROLOGICAL PARAMETERS
Acid rain: Commentary on controversial issues and observations on the role of fuel burning
[DE82-016914] N83-25219
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
METEOROLOGICAL RADAR
A 40 MHz - 2.2 MHz downconverter
[INPE-2607-NTE/194] N83-24770
Remote sensing of stored precipitation, i.e., soil moisture and snow N83-25307
Spaceborne precipitation radar N83-25308
Satellite borne dual millimetric wave length radar N83-25309
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310
Rain rate measurement capabilities using a Seasat type radar altimeter N83-25311
Adaptively pointing spaceborne radar for precipitation measurements N83-25315
The outlook for precipitation measurements from space N83-25316
METEOROLOGICAL SATELLITES
Precipitation Measurements From Space: Workshop report. An element of the climate observing system study
[NASA-TM-85329] N83-25269
Sampling problems N83-25271
Ground-truth measurement systems N83-25272
Use of the optimal polarization concept in electromagnetic imaging of hydrometeor distributions N83-25313
Bistatic radar meteorological satellite N83-25314
Synoptic meteorology, part 1
[INPE-2605-MD/021] N83-25319
METEOROLOGICAL SERVICES
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
METEOROLOGY
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255
AVE/VAS 4: 25-mb sounding data
[NASA-CR-170739] N83-25266
AVE/VAS 5: 25-mb sounding data
[NASA-CR-170740] N83-25267
Some statistical problems inherent in measuring precipitation N83-25284
METHOXY SYSTEMS
Laser spectroscopy of combustion intermediates
[DE83-004869] N83-24590
METHYL ALCOHOLS
Coal/oil thixogel fuels for diesels
[DE83-000398] N83-24719
Alcohol/petroleum systems as fuels for diesel engines
[DE82-020752] N83-24721
METHYL POLYSILOXANE
Novel mesogenic polysiloxane solvents for gas-liquid chromatography
[DE82-020753] N83-24613
MICROANALYSIS
The Sandia nuclear microprobe
[DE83-005363] N83-24839
MICROCOMPUTERS
A VAX assembler for the Intel 8748 microcomputer
[AD-A123378] N83-25404
MICROCRACKS
Stresses during fabrication of cylindrically woven carbon-carbon composites
[AD-A123153] N83-24567
MICROELECTRONICS
Microcircuit radiation effects databank
[NASA-TM-85328] N83-24771
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774
Advanced electronic technology
[AD-A123581] N83-24779
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039
MICROHARDNESS
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
MICROPROCESSORS
The application of ASP: An automated seismic processor N83-24963
Implementation of a fully reconfigurable multimicroprocessor
[DE82-021769] N83-25384
MICROSCOPY
Microspectroscopy
[DE82-020158] N83-24614
MICROSTRUCTURE
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123166] N83-24646
Swelling and microstructural development in path A PCA and type 316 stainless steel irradiated in HFIR to about 22 dpa N83-24654
Microstructural development of 20 percent-cold-worked type 316 stainless steel irradiated in ORR at 250 to 500 deg C N83-24657
The ductility behavior of irradiated path alloys N83-24658
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691
Vitreous enamel damping material development
[AD-A124290] N83-24697
Structure of Surfaces of Interfaces
[DE82-019302] N83-25606
MICROWAVE AMPLIFIERS
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions
[AD-A123554] N83-24784
MICROWAVE EMISSION
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643
Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst
[INPE-2672-PRE/281] N83-25644
MICROWAVE EQUIPMENT
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
Spaceborne precipitation radar N83-25308
MICROWAVE LANDING SYSTEMS
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
MICROWAVE RADIOMETERS
Microwave radiometry and hybrid precipitation measurements N83-25274
Inference of precipitation through thermal infrared measurements of soil moisture N83-25298
Combined spaceborne and conventional measurements for precipitation estimation N83-25300
Using underwater ambient noise levels to measure rainfall rate: A review N83-25302
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304
Rain rate measurement capabilities using a Seasat type radar altimeter N83-25311
MICROWAVE SCATTERING
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature --- central Russian steppes, and high plains of Montana, North Dakota, and Canada
[E83-10297] N83-25000
MICROWAVE SENSORS
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
MICROWAVES
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Beaufort/Bering 1979 microwave remote sensing data catalog report, 14-24 March 1979
[NASA-TM-84609] N83-25337
Microwave laboratory computer program library
[INPE-2613-NTE/195] N83-25390
MIGRATION
Verification and improvement of a predictive model for radionuclide migration N83-24944
Uranium (VI) retardation mechanisms N83-24946
Sorptive diffusion in clay gels N83-24947
MILITARY AIRCRAFT
Proposed MIL standard and handbook: Flying qualities of air vehicles. Volume 1: Proposed MIL standard
[AD-A123674] N83-24468
MILITARY HELICOPTERS
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502
MILITARY OPERATIONS
Situation climatic briefs
[AD-A123369] N83-25330
MILLIMETER WAVES
Analysis of the suspended H-waveguide and other related dielectric waveguide structures
[AD-A124342] N83-24757
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24781
Spaceborne precipitation radar N83-25308
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596
Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst
[INPE-2672-PRE/281] N83-25644
MILLING MACHINES
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727
MINERAL EXPLORATION
Methodology of remote sensing data interpretation and geological applications --- Brazil
[E83-10299] N83-25002
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
MINERAL OILS
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24836
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856
MINERALS
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989
Land use/mineral rights map series
[DE83-901050] N83-25012
MINES (EXCAVATIONS)
Rod-type extensometers in long-term elevated temperature service N83-24953
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
The measurement of in situ stress using NQR/NMR N83-24991
Land use/mineral rights map series
[DE83-901050] N83-25012
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
Studies of earth stress and rock properties and the hydraulic-fracturing process
[DE82-016779] N83-25259
MINES (ORDNANCE)
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774
MINIATURE ELECTRONIC EQUIPMENT
Capacity selector value electronics enclosure assembly controller card assembly test specifications
[AD-A123539] N83-24772
MINIATURIZATION
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539

MINIMAX TECHNIQUE
Minimax robustness in communication and control --- minimax robustness in communication and control
[AD-A124639] N83-25489
MINING
Geothermal development plan: Cochise/Santa Cruz Counties
[DE83-004880] N83-25206
MIRROR FUSION
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
Thermal-barrier trapping current in a tandem mirror
[DE82-021695] N83-25579
MIRRORS
Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24886
Energy and Technology Review
[DE83-003802] N83-25115
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report
[NASA-CR-170742] N83-25537
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544
Lightweight Zerodur mirror technology
[AD-A123536] N83-25555
Vertically fused face sheet performance
[AD-A123420] N83-25557
MISSILE RANGES
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255
MISSILE TRAJECTORIES
Computer prediction of store aerodynamic loading during separation
[AD-A124693] N83-24483
MISSION PLANNING
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528
The Brazilian Solar Physics Program and results from the energy of solar flares
[INPE-2631-PRE/258] N83-25642
MIXING
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321
MIXTURES
Large scale hydrogen-air detonations
[DE82-020353] N83-24722
MOBILITY
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217
MODELS
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
Geologic model of the Cerro Prieto geothermal field N83-24978
Reservoir engineering studies of the Cerro Prieto geothermal field N83-24980
MODULUS OF ELASTICITY
Thermomechanical properties of Stripa granite N83-24951
MOISTURE
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
MOISTURE CONTENT
Experimental comparison of icing cloud instruments
[NASA-TM-83340] N83-24487
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements --- Kansas and Indiana
[E83-10293] N83-24996
Severe storms requirements for precipitation information N83-25281
Energy sources and climate
[DE82-020612] N83-25334
MOLECULAR CLOUDS
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630
MOLECULAR COLLISIONS
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515
MOLECULAR IONS
Negative-ion states
[DE82-020832] N83-25517
MOLECULAR RELAXATION
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
MOLECULAR STRUCTURE
Iron-nickel alloys as canister material for radioactive waste disposal in underground repositories N83-24935
MOLTEN SALTS
Thermal conductivity of molten alkali nitrates N83-25084
Effects on soils from hot storage tanks N83-25085
High temperature active heat exchanger research for latent heat storage N83-25091
Applied battery and electrochemical research program
[DE82-020600] N83-25132
MOLYBDENUM
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
MOLYBDENUM ALLOYS
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
MOLYBDENUM COMPOUNDS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
MOMENTS
Moment series for moment estimators of the parameters of a Weibull density
[DE82-018265] N83-25473
MOMENTS OF INERTIA
Behavior of nuclei at high angular momentum
[DE82-020267] N83-25514
MONITORS
The DOE/NASA wind turbine data acquisition system. Part 3: Unattended power performance monitor
[NASA-CR-165540] N83-24516
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
MONOCHROMATIC RADIATION
Generators of coherent radiation from relativistic electrons
[DE82-020370] N83-25521
MONOPULSE RADAR
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745
MONOTONE FUNCTIONS
Continuous multistate structure functions
[AD-A123444] N83-25466
MONTE CARLO METHOD
Generating parallel correlated transition frequencies for a Markov chain
[AD-A124250] N83-25478
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479
MONTMORILLONITE
Sorptive diffusion in clay gels N83-24947
MORPHOLOGY
Stresses during fabrication of cylindrically woven carbon-carbon composites
[AD-A123153] N83-24567
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83389] N83-24637
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249
MOSAICS
A Catalog of Selected Viking Orbiter Images
[NASA-RP-1093] N83-25636
MOUNTING
The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899
MRCA AIRCRAFT
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
MULTIPLE ACCESS
Performance evaluation of multihop packet radio systems
[AD-A123574] N83-24754
MULTIPOLES
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
MULTIPROCESSING (COMPUTERS)
Implementation of a fully reconfigurable multimicroprocessor
[DE82-021769] N83-25384
MULTISPECTRAL BAND SCANNERS
AN-A46. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997
MULTISTATIC RADAR
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24748
Use of the optimal polarization concept in electromagnetic imaging of hydrometeor distributions N83-25313
Bistatic radar meteorological satellite N83-25314
MULTIVARIATE STATISTICAL ANALYSIS
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462
Aspects of model selection in multivariate analyses
[DE82-019576] N83-25483
MYLAR (TRADEMARK)
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912

N

NAPHTHALENE
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
NASA PROGRAMS
National Aeronautics and Space Administration Authorization Act, 1983 N83-25622
National Aeronautics and Space Administration Authorization Act, 1983 N83-25623
NATIONAL AIRSPACE UTILIZATION SYSTEM
National Airspace System Plan, facilities, equipment and associated development N83-24521
NATURAL GAS
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
Advanced coal-gasification system for electric-power generation
[DE82-021338] N83-25141
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211
NATURAL GAS EXPLORATION
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
NATURAL LANGUAGE (COMPUTERS)
Natural language processing using spreading activation and lateral inhibition
[AD-A123427] N83-25415
NAVIER-STOKES EQUATION
Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
The bidimensional Stefan problem with convection: The time-dependent case
[AD-A124377] N83-24810
Green's functions at zero viscosity
[DE83-004528] N83-25475
NAVIGATION AIDS
Automation of the DMA list of lights and radio navigational aids
[AD-A124199] N83-24496
HHE/LORAN-C surveying
[AD-A124343] N83-24498
NAVIGATION INSTRUMENTS
Latch fittings for the scientific instruments on the space telescope N83-24898

NEAR INFRARED RADIATION
Extended near infrared emission from visual reflection nebulae
[NASA-TM-85315] N83-25629
NEBULAE
Extended near infrared emission from visual reflection nebulae
[NASA-TM-85315] N83-25629
NEGATIVE IONS
Negative-ion states
[DE82-020832] N83-25517
Production and reactions of negative ions
[DE82-020824] N83-25520
NEPHELOMETERS
Development of an airborne visibility meter
[AD-A124276] N83-25327
NEPTUNE (PLANET)
Research in planetary astronomy and operation of Mauna Kea Observatory
[NASA-CR-170246] N83-25631
NERNST-ETTINGSHAUSEN EFFECT
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
NETWORK ANALYSIS
Natural language processing using spreading activation and lateral inhibition
[AD-A123427] N83-25415
Minimization of path lengths in single stage connection networks
[DE82-020174] N83-25429
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479
NETWORK SYNTHESIS
The Regional Seismic Test Network N83-25117
NEURONS
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353
NEUTRON FLUX DENSITY
Maximum entropy spectral analysis of geomagnetic disturbance indices
[INPE-1693-RPE/120] N83-25242
NEUTRON IRRADIATION
Neutron source characterization for materials experiments N83-24649
NEUTRON RADIOGRAPHY
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
NEUTRON SOURCES
Neutron source characterization for materials experiments N83-24649
NEUTRON SPECTRA
Neutron source characterization for materials experiments N83-24649
NEUTRONS
Neutronics calculations in support of the ORR-MFE-4 spectral tailoring experiments N83-24652
NEVADA
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261
NEW MEXICO
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
NICKEL ALLOYS
Improved nickel base coating alloy --- oxidation resistant coatings
[NASA-CASE-LEW-13834-1] N83-24639
Neutronics calculations in support of the ORR-MFE-4 spectral tailoring experiments N83-24652
The ductility behavior of irradiated path alloys N83-24658
Electrochemical aspects of stress-corrosion crack growth
[DE82-021543] N83-24680
Iron-nickel alloys as canister material for radioactive waste disposal in underground repositories N83-24935
Research, development, and demonstration of nickel-iron batteries for electric-vehicle propulsion
[DE82-021266] N83-25137
NICKEL COMPOUNDS
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
NICKEL HYDROGEN BATTERIES
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries
[NASA-TM-83386] N83-24571
Cycle life test and failure model of nickel-hydrogen cells
[NASA-TM-83375] N83-25038
NICKEL OXIDES
Advanced-fuel-cell development
[DE82-021272] N83-25136
Optical properties related to electrical switching of Li doped NiO crystals
[AD-A124299] N83-25591
NICKEL STEELS
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643
NICKEL ZINC BATTERIES
Report for 1981 on research, development and demonstration of nickel-zinc batteries for electric vehicle propulsion
[ANL/OPEM-81-12] N83-25045
NIOBIUM
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
NIOBIUM ALLOYS
Powder-metallurgy-processed A15 Nb3Al superconducting wires
[DE82-022057] N83-24682
NITRATES
Thermal conductivity of molten alkali nitrates N83-25084
NITRIC ACID
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693
NITRIDING
Tribological and microstructural characteristics of ion-nitrided steels
[NASA-TM-83368] N83-24635
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640
NITROGEN
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640
Formation of silicon nitride structures by direct electron-beam writing
[AD-A124344] N83-25588
NITROGEN OXIDES
Catalytic reduction of nitrogen dioxide
[AD-A123176] N83-24587
Acid rain: A background report
[DE83-901079] N83-25236
NITROMETHANE
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
NOISE (SOUND)
Noise and thermal contributions in transferred electron two and three terminal devices
[AD-A124326] N83-24756
Alternatives to optimal detection
[AD-A123454] N83-24760
Longitudinal study of human hearings: Its relationship to noise and other factors. 3: Results from the first five years
[AD-A123175] N83-25355
NOISE INTENSITY
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions
[AD-A123554] N83-24784
NOISE MEASUREMENT
Combining visible and infrared techniques with LAMMR for daily rainfall estimates N83-25301
NOISE POLLUTION
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500
NOISE PREDICTION (AIRCRAFT)
Limits on the prediction of helicopter rotor noise using thickness and loading sources: Validation of helicopter noise prediction techniques
[NASA-CR-166097] N83-25498
NOISE PROPAGATION
Study of noise reduction characteristics of double-wall panels
[NASA-CR-170308] N83-25497
NOISE REDUCTION
Improvement of the narrowband linear predictive coder. Part 1: Analysis improvements
[AD-A124313] N83-24758
Study of noise reduction characteristics of double-wall panels
[NASA-CR-170308] N83-25497
NOISE TOLERANCE
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496
NOMOGRAPHS
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
NONDESTRUCTIVE TESTS
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester
[AD-A124267] N83-24835
Near-surface crack detection in nuclear pressure vessels
[DE82-019184] N83-24871
Thermal NDE method for thermal spray coatings
[DE82-020641] N83-24872
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919
NONLINEAR EQUATIONS
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
Existence of forced oscillations for some nonlinear differential equations
[AD-A124372] N83-25439
A diffusion equation with a nonmonotone constitutive function
[AD-A124345] N83-25444
On a Volterra equation with a locally finite measure and L infinity perturbation
[AD-A124347] N83-25446
A nonlinear volterra integrodifferential equation occurring in heat flow
[AD-A124349] N83-25448
NONLINEAR FILTERS
Filtering of systems with nonlinearities
[AD-A124635] N83-25459
NONLINEAR SYSTEMS
Nonlinear transient analysis of layered composite plates
[AD-A123182] N83-24566
Filtering of systems with nonlinearities
[AD-A124635] N83-25459
NONUNIFORM FLOW
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
NORMAL DENSITY FUNCTIONS
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260
NORTH DAKOTA
Dickinson geothermal study
[DE82-016945] N83-25018
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023
NOSES (FOREBODIES)
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476
NOVA LASER SYSTEM
Optical components for the Nova laser
[DE82-017294] N83-24850
NOZZLE GEOMETRY
Perfect bell nozzle parametric and optimization curves
[NASA-RP-1104] N83-24549
NOZZLES
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics --- Langley 16-ft transonic tunnel tests
[NASA-TP-2158] N83-24478
NUCLEAR EXPLOSIONS
Simulated blast testing of advance interceptor materials
[AD-A124374] N83-24563
Calculation of wing response to gusts and blast waves with vortex lift effect
[NASA-CR-170340] N83-24796

NUCLEAR FUEL REPROCESSING
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593
NUCLEAR FUELS
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel
[DE82-020501] N83-24683
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program
[DE82-022078] N83-24736
NUCLEAR FUSION
Application of Robertson's collective focusing to final focusing
[DE83-004050] N83-25522
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
US program in heavy-ion fusion
[DE82-015769] N83-25568
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors
[DE82-020283] N83-25581
NUCLEAR MAGNETIC RESONANCE
The measurement of in situ stress using NQR/NMR
N83-24991
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344
NUCLEAR PHYSICS
Behavior of nuclei at high angular momentum
[DE82-020267] N83-25514
NUCLEAR POWER PLANTS
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
LANDSAT-4 image data quality analysis for energy related applications --- nuclear power plant sites
[E83-10295] N83-24998
Reducing the size of a data base by using pattern-recognition techniques
[DE82-017388] N83-25618
NUCLEAR POWER REACTORS
A digital image processor as a human factors engineering tool
[DE82-015173] N83-25376
NUCLEAR REACTIONS
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
The Sandia nuclear microprobe
[DE83-005363] N83-24839
Electroweak interactions
[DE82-020146] N83-25494
Inner shells as a link between atomic and nuclear physics
[DE83-004560] N83-25523
NUCLEAR REACTOR CONTROL
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
NUCLEAR REACTORS
Operation of the ORR spectral tailoring experiments ORR-MFE-4A and ORR-MFE-4B N83-24650
Near-surface crack detection in nuclear pressure vessels
[DE82-019184] N83-24871
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
NUCLEAR RESEARCH
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
US program in heavy-ion fusion
[DE82-015769] N83-25568
NUCLEATION
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617
Vitreous enamel damping material development
[AD-A124290] N83-24697
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919
NUCLEONS
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon
[NASA-TM-84636] N83-25525
NUCLEOTIDES
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344
NUMBER THEORY
The r-Stirling numbers
[AD-A123472] N83-25450
NUMERICAL ANALYSIS
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436
A method for interpolating in Bondarenko factor tables and other functions
[DE82-015685] N83-25470
NUMERICAL DIFFERENTIATION
A standard verification for rainfall estimation from remote platforms N83-25288
NUMERICAL INTEGRATION
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469
NUMERICAL WEATHER FORECASTING
Evaluation of the synoptic and mesoscale predictive capabilities of a mesoscale atmospheric simulation system
[NASA-TM-84995] N83-25317
NUTATION DAMPERS
Nutation Damper System N83-24895
NYLON (TRADEMARK)
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910

O

O STARS
Diameters of O type stars based on ultraviolet observations
[INPE-2692-PRE/290] N83-25632
OCCULTATION
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646
OCEAN COLOR SCANNER
Needs, opportunities and strategies for a long-term oceanic sciences satellite program
[NASA-CR-170275] N83-25339
OCEAN CURRENTS
Performance optimization of a pneumatic wave energy conversion device
[AD-A124295] N83-25114
OCEAN DYNAMICS
A survey of radar rain measurement techniques
N83-25290
OCEAN MODELS
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341
OCEAN SURFACE
Combining visible and infrared techniques with LAMMR for daily rainfall estimates N83-25301
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341
OCEAN TEMPERATURE
Oceanographic observations North Pacific Ocean Station November and Pacific Standard Monitoring Sections P3, P4, P5, and P6, July 1966 - June 1974
[AD-A122224] N83-25342
OCEANOGRAPHY
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
OFFGASSING
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231
OFFSHORE ENERGY SOURCES
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
OIL ADDITIVES
Lubricant foaming and aeration study
[AD-A124184] N83-24696
OIL EXPLORATION
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
OIL RECOVERY
Enhanced recovery of heavy oils with alkali
N83-24987
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
OILS
Coal/oil thixogel fuels for diesels
[DE83-000398] N83-24719
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726
Cutting-fluid conservation
[Y-2250] N83-24728
Enhanced recovery of heavy oils with alkali
N83-24987
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231
OLIVINE
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Evaluation of olivine refractories for TES N83-25070
ON-LINE PROGRAMMING
Accuracy and completeness of problem solutions with example-solutions
[AD-A124087] N83-25463
ON-LINE SYSTEMS
Agricultural requirements for precipitation measurements N83-25279
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
ONE DIMENSIONAL FLOW
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
Modeling heat transfer in PCM's with the Budak method N83-25077
Development of natural stratification technology
N83-25078
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
OPERATING COSTS
Goodyear Lake hydroelectric generating station redevelopment
[DE83-004753] N83-25127
OPERATING SYSTEMS (COMPUTERS)
Using a batch processor to create an interactive menu-driven operating system
[LA-9205-MS] N83-25381
OPERATOR PERFORMANCE
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831
OPTICAL COMMUNICATION
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
Efficient Raman conversion of XeCl laser into the blue-green region
[AD-A124193] N83-24843
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
OPTICAL COUPLING
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
OPTICAL EQUIPMENT
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
OPTICAL MEASUREMENT
Microspectroscopy
[DE82-020158] N83-24614
Rotary target v-block --- wind tunnel apparatus
[NASA-CASE-LAR-12007-3] N83-25542
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544

OPTICAL MEMORY (DATA STORAGE)
Reading and writing of photochemical holes using GaAlAs diode lasers
[AD-A124633] N83-24846
OPTICAL PATHS
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
OPTICAL PROPERTIES
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775
Optical components for the Nova laser
[DE82-017294] N83-24850
Research, design and development study to measure atmospheric optical turbulence
[AD-A123392] N83-25256
Optical constants for silicon at 300K and 10K determined from 1.64 to 4.73 eV by ellipsometry
[DE82-010062] N83-25558
Optical properties related to electrical switching of Li doped NiO crystals
[AD-A124299] N83-25591
OPTICAL PUMPING
Optical pumping of hot phonons in GaAs
[DE82-020519] N83-24852
OPTICAL RADAR
Differential-absorption LIDAR technology for light twin-engine aircraft operation
[DE83-003888] N83-25232
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556
OPTICAL SCANNERS
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546
OPTICAL WAVEGUIDES
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
OPTIMAL CONTROL
Computer programs for generation and evaluation of near-optimum vertical flight profiles
[NASA-CR-3688] N83-24500
Singular differential game numerical technique and closed loop guidance and control strategies
[AD-A124625] N83-25484
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
Stochastic differential game techniques
[AD-A124634] N83-25487
OPTIMIZATION
Minimization of path lengths in single stage connection networks
[DE82-020174] N83-25429
Sparse matrix methods in optimization
[AD-A124397] N83-25442
A study in parallel computation: The traveling salesman problem
[AD-A123327] N83-25455
ORBIT CALCULATION
Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
ORBIT MANEUVERING ENGINE (SPACE SHUTTLE)
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171656] N83-24551
ORBITAL MECHANICS
Effects of small thrust on the motion of an artificial Earth satellite
[NAL-TR-744] N83-24533
ORBITAL SPACE STATIONS
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540
OREGON
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
ORGANIC CHEMISTRY
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
ORGANIC COMPOUNDS
Applications of multiproperty analysis in the prediction of complex-system thermophysical behavior
[DE82-020859] N83-24603
ORGANIZATIONS
Organizational context of human factors
[AD-A123435] N83-25374
ORIENTATION
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353
ORION NEBULA
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630
OROGRAPHY
On the effect of temporal sampling on the observation of mean rainfall N83-25285
ORR-SOMMERFELD EQUATIONS
Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
ORTHOPEDICS
Orthotic devices using lightweight composite materials
[NASA-CR-166105] N83-24560
OSCILLATIONS
Tides in the thermosphere: A review. Environmental research papers
[AD-A124314] N83-25252
Existence of forced oscillations for some nonlinear differential equations
[AD-A124372] N83-25439
OUTLIERS (STATISTICS)
Simulation analysis of some outlier detection methods
[ORNL/CSO/TM-143] N83-25434
OVERPRESSURE
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712
OXIDATION RESISTANCE
Improved nickel base coating alloy --- oxidation resistant coatings
[NASA-CASE-LEW-13834-1] N83-24639
OXIDATION-REDUCTION REACTIONS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
OXIDE FILMS
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
OXIDES
Oxide and halide laser glasses
[DE82-020162] N83-24854
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
Structure of large-angle grain boundaries in metals and ceramic oxides
[DE82-022006] N83-25608
OXYGEN
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
Transport properties of oxygen
[NASA-RP-1102] N83-24800
OXYGEN CONSUMPTION
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362
OZONE
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253

P

PACIFIC OCEAN
Oceanographic observations North Pacific Ocean Station November and Pacific Standard Monitoring Sections P3, P4, P5, and P6, July 1966 - June 1974
[AD-A122224] N83-25342
PACKET SWITCHING
Performance evaluation of multihop packet radio systems
[AD-A123574] N83-24754
PACKETS (COMMUNICATION)
Performance evaluation of multihop packet radio systems
[AD-A123574] N83-24754
PALEOBIOLOGY
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
PANELS
High-speed machining of Space Shuttle External Tank (ET) panels
[NASA-CR-170751] N83-24537
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197
Study of noise reduction characteristics of double-wall panels
[NASA-CR-170308] N83-25497
PAPER (MATERIAL)
TES technology transfer in the pulp and paper industry N83-25081
PARABOLIC DIFFERENTIAL EQUATIONS
Mean values of subsolutions of elliptic and parabolic equations
[AD-A124355] N83-25449
PARABOLIC REFLECTORS
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
PARACHUTES
An experimental and theoretical investigation of the reduction in parachute drag caused by forebody wake effects: Data compilation and program summary
[DE83-005364] N83-24486
PARALLAX
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831
PARALLEL FLOW
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543
PARALLEL PROCESSING (COMPUTERS)
Massively parallel processor computer
[NASA-CASE-GSC-12223-1] N83-25378
Implementation of a fully reconfigurable multimicroprocessor
[DE82-021769] N83-25384
A study in parallel computation: The traveling salesman problem
[AD-A123327] N83-25455
PARAMETER IDENTIFICATION
On parameter identification for large space structures
[NASA-CR-170306] N83-24543
Vector wind profile gust model
[NASA-CR-170762] N83-25320
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469
PARAMETERIZATION
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341
PARTIAL DIFFERENTIAL EQUATIONS
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811
Natural convection in an enclosed cavity
[NASA-CR-166112] N83-25433
Existence of forced oscillations for some nonlinear differential equations
[AD-A124372] N83-25439
A diffusion equation with a nonmonotone constitutive function
[AD-A124345] N83-25444
Periodic solutions of non-dissipatively perturbed wave equations in several space variables
[AD-A124367] N83-25453
Two approximations of solutions of Hamilton-Jacobi equations
[AD-A124359] N83-25464

Using the method-of-lines technique to solve initial-boundary-value partial differential equations
[DE82-020909] N83-25472

PARTICLE ACCELERATORS
High-field superconducting accelerator magnets
[DE82-020517] N83-25495
Application of Robertson's collective focusing to final focusing
[DE83-004050] N83-25522
US program in heavy-ion fusion
[DE82-015769] N83-25568

PARTICLE INTERACTIONS
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon
[NASA-TM-84636] N83-25525
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641

PARTICLE LADEN JETS
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795

PARTICLE SIZE DISTRIBUTION
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
Transport characteristics of alternate supply fuels
[DE82-020246] N83-24720

PARTICLES
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617

PATTERN RECOGNITION
Feature component reduction through divergence analysis
[AD-A123474] N83-25007
Machine classification of cloud particle types
[AD-A123402] N83-25331
The perception of objects and their functional uses
[AD-A122797] N83-25370
On shapes
[TR-92] N83-25388
Reducing the size of a data base by using pattern-recognition techniques
[DE82-017388] N83-25618

PATTERN REGISTRATION
AN-A46. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques
[INPE-2710-PRE/298] N83-25437

PAVEMENTS
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732

PEAKS
Dynamic behavior of a class of photovoltaic converters
[DE82-019344] N83-25190

PELLETS
Pelletization and roll encapsulation of phase change materials N83-25074
Pelletized-waste-form demonstration program, October 1981 - March 1982
[DE82-015832] N83-25531

PENS
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857

PENTOLITE
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712

PEPTIDES
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344

PERFORMANCE PREDICTION
Computer modeling of heat pipe performance
[NASA-CR-171641] N83-24806
Verification and improvement of a predictive model for radionuclide migration N83-24944

PERFORMANCE TESTS
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation
[DE83-005168] N83-24827
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Single cell performance studies on the Fe/Cr Redox Energy Storage System using mixed reactant solutions at elevated temperature
[NASA-TM-83385] N83-25042
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
Performance testing of the Solar Kinetics T-700A solar collector
[DE83-005382] N83-25176

PERIODIC VARIATIONS
A critical review of pulsating combustion
[TAE-468] N83-24576

PERIODICALS
Automation of the DMA list of lights and radio navigational aids
[AD-A124199] N83-24496

PERISCOPES
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544

PERMEABILITY
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
Porous media equivalent for a network of discontinuous fractures N83-24940
Determining size and interconnection of fractures from constant-head well tests N83-24941
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Research on nuclear waste isolation at Stripa: An overview N83-24949
Geophysical borehole measurements in low-permeability rock N83-24955
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957

PERMITTIVITY
Understanding dielectric cure monitoring
[AD-A123507] N83-24834

PERMUTATIONS
The r-Stirling numbers
[AD-A123472] N83-25450

PEROXIDES
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708

PERTURBATION
Atmospheric drag effects on the motion of an artificial Earth satellite
[NAL-TR-748] N83-24534
On a Volterra equation with a locally finite measure and L infinity perturbation
[AD-A124347] N83-25446
Periodic solutions of non-dissipatively perturbed wave equations in several space variables
[AD-A124367] N83-25453

PETROGRAPHY
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924

PETROLEUM PRODUCTS
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714

PH
Uranium (VI) retardation mechanisms N83-24946

PHASE CHANGE MATERIALS
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735
Some aspects of the computer simulation of conduction heat transfer and phase change processes
[ORNL/CSD-100] N83-24801
Pelletization and roll encapsulation of phase change materials N83-25074
Basic chemical studies related to low-temperature thermal-energy storage. Task 1: Thermo-dynamic properties and interactions of salt hydrates used as phase-change materials
[DE82-020626] N83-25162

PHASE DIAGRAMS
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence — for laser devices
[AD-A124300] N83-24582
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605

PHASE TRANSFORMATIONS
Mesophase behavior in carbon fiber bundles
[AD-A123322] N83-24585
Vitreous enamel damping material development
[AD-A124290] N83-24697
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144
A mushy zone model with an exact solution
[ORNL/CSD-91] N83-25435
Crystalline to amorphous transformation in silicon
[DE83-003713] N83-25601

PHASED ARRAYS
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748

PHENOLIC RESINS
Intumescent coating development
[NASA-CR-170737] N83-24694

PHENYLS
On some derivatives of phenylethers, 2
[NASA-TM-77020] N83-24555

PHOSPHATES
Cost of phosphate removal in municipal wastewater treatment plants
[NASA-TM-77060] N83-24573
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704

PHOTOCHEMICAL REACTIONS
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex
[AD-A124302] N83-24583
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609
Reading and writing of photochemical holes using GaAlAs diode lasers
[AD-A124633] N83-24846
Negative-ion states
[DE82-020832] N83-25517
Production and reactions of negative ions
[DE82-020824] N83-25520

PHOTOCONDUCTIVITY
Channel plating
[DE82-021687] N83-24788
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors
[DE83-004523] N83-25611

PHOTOELECTRIC CELLS
Spectral response measurements for solar cells N83-25110

PHOTOELECTRIC EMISSION
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604

PHOTOELECTRIC GENERATORS
DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041

PHOTOELECTROCHEMICAL DEVICES
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-012700] N83-25047
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

PHOTOGEOLOGY
Methodology of remote sensing data interpretation and geological applications — Brazil
[E83-10299] N83-25002

PHOTOINTERPRETATION
Methodology of remote sensing data interpretation and geological applications — Brazil
[E83-10299] N83-25002

PHOTOLUMINESCENCE
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590

PHOTOMETRY
Low light level imaging design
[AD-A124283] N83-25547

PHOTONS
Reproducibility of an automated laser Raman system for light gas analysis
[MLM-2804] N83-24841
Optical pumping of hot phonons in GaAs
[DE82-020519] N83-24852
PHOTOVOLTAIC CELLS
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon slicing by fixed abrasive slicing technique N83-25030
Silicon crystal growth in vacuum N83-25031
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033
Spectrophotovoltaic orbital power generation
[NASA-CR-170754] N83-25040
Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities
[DOE/ET-20279/185] N83-25052
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors
[DOE/ET-20279/162] N83-25053
Data report for the Southwest Residential Experiment Station, December 1981
[DOE/ET-20279/184] N83-25054
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Photovoltaic measurement equipment needs. View of a prospective supplier N83-25094
Photovoltaic measurement equipment needs. View of a supplier N83-25095
The use of test structures for reliability prediction and process control of integrated circuits and photovoltaics N83-25096
Spectroradiometer measurements in support of photovoltaic device testing N83-25103
The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105
Source for reference cells N83-25106
An approved laboratory program for photovoltaic reference cell development N83-25107
Progress in the development of standad procedures for the global method of calibration of photovoltaic reference cells N83-25108
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111
Intermediate photovoltaic system application experiment operational performance report for Newman Power Station, El Paso, Texas, volume 14
[DE83-005377] N83-25130
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982
[DE83-005489] N83-25167
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169
Initial detailed designs for intermediate photovoltaic systems: Office building
[DE83-005365] N83-25172
Intermediate photovoltaic system application experiment operational performance report. Volume 3. For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE83-005379] N83-25173
Intermediate photovoltaic system application experiment operational performance report. Volume 4. For G. N. Wilcox Memorial Hospital, Kauai, Hawaii for June, July, and August 1982
[DE83-005380] N83-25174
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Dynamic behavior of a class of photovoltaic converters
[DE82-019344] N83-25190
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
PHOTOVOLTAIC EFFECT
DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041
Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities
[DOE/ET-20279/185] N83-25052
Data report for the Northeast Residential Experiment Station, November 1981
[DOE/ET-20279/182] N83-25055
PHYSICAL EXERCISE
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357
PHYSICAL FITNESS
Air Force physical fitness: As assessment of characteristics and programs which affect individual physical fitness
[AD-A123022] N83-25359
PHYSIOLOGICAL EFFECTS
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses
[AD-A122796] N83-25357
Sleep spindle and delta changes during chronic use of a short-acting and a long-acting benzodiazepine hypnotic
[AD-A123149] N83-25360
Sleep loss effects on continuous sustained performance
[AD-A122392] N83-25364
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365
PIEZOELECTRICITY
Development of the charge amplifier for piezoelectric accelerometer sensors
[NAL-TR-749] N83-24832
PILOT PERFORMANCE
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
Subsidiary radio communications tasks for workload assessment in R&D simulations. 2: Task sensitivity evaluation
[AD-A122545] N83-25375
PILOT PLANTS
Uranium from seawater
[DE83-000658] N83-24595
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
Assessment of materials and components performance in Bi-Gas, Westinghouse and Combustion Engineering gasification pilot plants
[DE82-020457] N83-25140
Laboratory program to support H-coal pilot-plant operations: Volume 2: PDU run 8
[DE82-008213] N83-25187
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231
PILOT SELECTION
Pilot selection criteria for the AH-64 helicopter
[AD-A122495] N83-25371
PILOTS (PERSONNEL)
Subsidiary radio communications tasks for workload assessment in R&D simulations. 2: Task sensitivity evaluation
[AD-A122545] N83-25375
PINCH EFFECT
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
PINHOLES
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646
PINS
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks
[NASA-TM-82520] N83-24553
PIPELINES
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California
[NASA-TM-84317] N83-25003
PIPES (TUBES)
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program
[DE82-022078] N83-24736
Design of a diesel exhaust-gas purification system for inert-gas drilling
[DE82-017071] N83-24866
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913
Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine
[NASA-TM-83367] N83-25499
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538
PISTON ENGINES
Calculations and measurements of the flow in a motored model engine and implications for open-chamber direct-injection engines
[DE83-019033] N83-24868
Testing and performance characteristics of a 1-kW free piston Stirling engine
[NASA-TM-82999] N83-25036
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625
PLANAR STRUCTURES
Nonuniformities in laser-ablated plasma
[AD-A123643] N83-24844
PLANE WAVES
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460
PLANETARY ENVIRONMENTS
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556
PLANETARY MAGNETIC FIELDS
Fine-scale structure of the Jovian magnetotail current sheet
[NASA-TM-85014] N83-25639
PLANETARY MAPPING
A Catalog of Selected Viking Orbiter Images
[NASA-RP-1093] N83-25636
PLANKTON
Tropic interactions of the sea nettle, Chrysaora quinquecirrha
[TR-82-2] N83-25338
PLANNING
Geothermal development plan: Pima County
[DE83-004877] N83-25120
Geothermal development plan: Maricopa County
[DE83-004876] N83-25214
PLANT STRESS
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California
[NASA-TM-84317] N83-25003
PLANTS (BOTANY)
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144
PLASMA ACCELERATION
Studies of accelerated compact toruses
[DE83-005488] N83-25584
PLASMA CONTROL
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524
Saturation of the lower-hybrid-drift instability by mode coupling
[AD-A123569] N83-25564
Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571
PLASMA DENSITY
Study of short-wavelength turbulence in dense plasmas
[DE83-004488] N83-25565
PLASMA DIAGNOSTICS
Study of short-wavelength turbulence in dense plasmas
[DE83-004488] N83-25565
PLASMA DYNAMICS
Natural Poisson structures of nonlinear plasma dynamics
[DE82-019299] N83-25572
PLASMA EQUILIBRIUM
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors
[DE82-020283] N83-25581

PLASMA FOCUS
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment --- controlled fusion
[CEA-R-5153] N83-25562
PLASMA HEATING
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583
PLASMA INTERACTIONS
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552
Theory and simulation of laser plasma coupling, 2
[DE82-020350] N83-25580
PLASMA LAYERS
Simulation of plasma double-layer structures
[NASA-CR-170279] N83-25563
PLASMA PHYSICS
Study of short-wavelength turbulence in dense plasmas
[DE83-004488] N83-25565
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
Natural Poisson structures of nonlinear plasma dynamics
[DE82-019299] N83-25572
Magnetic fusion energy and computers
[DE82-020165] N83-25573
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors
[DE82-020263] N83-25581
PLASMA RADIATION
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643
PLASMA SPRAYING
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610
PLASMA TURBULENCE
Research on turbulence in plasma
[NASA-CR-170260] N83-25561
Study of short-wavelength turbulence in dense plasmas
[DE83-004488] N83-25565
PLASMAS (PHYSICS)
Research on turbulence in plasma
[NASA-CR-170260] N83-25561
Simulation of plasma double-layer structures
[NASA-CR-170279] N83-25563
Theory and simulation of laser plasma coupling, 2
[DE82-020350] N83-25580
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594
Research in particles and fields
[NASA-CR-170335] N83-25634
PLASTIC DEFORMATION
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design
[AD-A119497] N83-24880
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240
The Stiffness of Joints
[TULEA-1981:22] N83-25241
PLASTIC FLOW
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
PLASTIC PROPERTIES
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647
PLATES
Advances and trends in plate buckling research
[AD-A123358] N83-24909
PLATES (STRUCTURAL MEMBERS)
Failure mechanics in low-velocity impacts on thin composite plates
[NASA-TP-2152] N83-24562
PLUTONIUM 238
Welding iridium heat-source capsules for space missions
[DE82-020098] N83-24865
Pelletized-waste-form demonstration program, October 1981 - March 1982
[DE82-015832] N83-25531
PNEUMATIC EQUIPMENT
Performance optimization of a pneumatic wave energy conversion device
[AD-A124295] N83-25114
System and method for moving a probe to follow movements of tissue
[NASA-CASE-NPO-15197-1] N83-25346
POINT DEFECTS
Crystalline to amorphous transformation in silicon
[DE83-003713] N83-25601
POINTING CONTROL SYSTEMS
Design of the Galileo remote science pointing actuators N83-24902
POINTS (MATHEMATICS)
Percentage points and power calculations for Outlier tests in a regression situation
[AD-A124369] N83-25482
POISSON DENSITY FUNCTIONS
The distributions of measures of visibility on line segments in three dimensional spaces under Poisson shadowing processes
[AD-A123183] N83-25458
Natural Poisson structures of nonlinear plasma dynamics
[DE82-019299] N83-25572
POLAR CAPS
Structure and dynamics of the winter polar cap F region
[AD-A123706] N83-25247
POLARIZATION (CHARGE SEPARATION)
Lubricant foaming and aeration study
[AD-A124184] N83-24696
POLARIZATION CHARACTERISTICS
Use of combined radar and radiometer systems in space for precipitation measurement: Some ideas N83-25312
POLARIZERS
Polarizer mechanism for the space telescope faint object spectrograph N83-24887
POLES (SUPPORTS)
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892
POLICIES
Difficulties with regression analysis of age-adjusted rates
[AD-A124381] N83-25476
POLLUTION CONTROL
Possible storage sites for disposal and environmental control of atmospheric carbon dioxide
[DE83-005993] N83-25229
Exclusion-list methodology for weatherization program in the Pacific Northwest
[DE83-004051] N83-25234
Acid rain: A background report
[DE83-901079] N83-25236
POLLUTION TRANSPORT
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters
[DE83-003711] N83-25224
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
POLYCARBONATES
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
POLYCRYSTALS
Orientation of ceramic microstructures by hot-forming methods
[DE83-005232] N83-24707
POLYETHYLENES
Crystallinity as a selection criterion for engineering properties of high-density polyethylene
[DE82-020496] N83-24706
POLYGONS
How to divide a polygon fairly
[AD-A123335] N83-25451
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461
POLYIMIDES
Intumescent coating development
[NASA-CR-170737] N83-24694
POLYMER CHEMISTRY
Status of the development of solid polymer electrolyte water electrolysis for large scale hydrogen generation N83-25058
POLYMERIC FILMS
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
POLYMERIZATION
Ionic aspects of soot formation
[DE82-020799] N83-24619
Annotated bibliography: Polymers in concrete
[AD-A123414] N83-24702
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708
POLYMERS
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones
[DE83-005029] N83-24709
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
POLYMETHYL METHACRYLATE
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
Methyl methacylate polymer-concrete for bomb damage repair
[AD-A123346] N83-24699
POLYTETRAFLUOROETHYLENE
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
PONDS
Wet storage of spent fuel
[DE82-014846] N83-25527
POPULATION THEORY
Difficulties with regression analysis of age-adjusted rates
[AD-A124381] N83-25476
POPULATIONS
Application of remote sensing to urban studies
[INPE-2625-NTE/197] N83-25004
POROSITY
Effects of preignition on pulverized-coal combustion
[DE82-020517] N83-24599
Consolidation of axi-symmetric bodies subjected to non axi-symmetric loading
[RR-CE-20] N83-24879
Porous media equivalent for a network of discontinuous fractures N83-24940
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Research on nuclear waste isolation at Stripa: An overview N83-24949
POROUS MATERIALS
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542
Experimental and numerical studies of natural convection in a Hele-Shaw cell
[DE83-005251] N83-24824
Verification and improvement of a predictive model for radionuclide migration N83-24944
PORTABLE EQUIPMENT
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362
POSITION (LOCATION)
Polar motion prediction analysis
[AD-A124198] N83-25250
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544
POSITIONING DEVICES (MACHINERY)
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892
POTASSIUM HYDROXIDES
High temperature active heat exchanger research for latent heat storage N83-25091
POTASSIUM 40
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
POTENTIAL ENERGY
Severe storms requirements for precipitation information N83-25281
POTENTIAL FLOW
Calculation of unsteady transonic potential flow over 3-dimensional wings with oscillating control surfaces
[NAL-TR-746] N83-24477

Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials [AD-A123372] N83-25403

POWDER METALLURGY

Powder-metallurgy-processed A15 Nb3Al superconducting wires [DE82-022057] N83-24682

POWER

Design of electron-beam controlled switches [AD-A124312] N83-24785

POWER CONDITIONING

Power conditioning subsystem design [AD-A124191] N83-25113

POWER LINES

Coupling an induction motor type generator to a-c power lines [NASA-CASE-MFS-25302-2] N83-24768

POWER PLANTS

Parameter monitoring for corrosion control of utility gas turbines [DE83-900991] N83-24675

The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988

Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086

Department of Energy Solar-Central-Receiver Annual Meeting [DE82-011932] N83-25192

Evaluation of dual-energy-use systems. Volume 1: Executive summary [DE83-900758] N83-25198

Evaluation of dual-energy-use systems, volume 2 [DE83-900757] N83-25199

Heber Known Geothermal Resources Area ethanol-fuel facility [DE83-004775] N83-25209

POWER SPECTRA

Dynamic behavior of a class of photovoltaic converters [DE82-019344] N83-25190

POYNTING THEOREM

Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane [AD-A123366] N83-25549

PRECIPITATION

Some statistical problems inherent in measuring precipitation N83-25284

PRECIPITATION (METEOROLOGY)

Cost of phosphate removal in municipal wastewater treatment plants [NASA-TM-77060] N83-24573

Precipitation Measurements From Space: Workshop report. An element of the climate observing system study [NASA-TM-85329] N83-25269

Summary of requirements and recommendations N83-25270

Sampling problems N83-25271

Ground-truth measurement systems N83-25272

Microwave radiometry and hybrid precipitation measurements N83-25274

Spaceborne radar N83-25275

A brief review of the present status of global precipitation estimates N83-25276

Precipitation measurement requirements for general circulation climate model development and applications N83-25277

Precipitation data for climate diagnostics N83-25278

Agricultural requirements for precipitation measurements N83-25279

Hydrologic forecasting requirements for precipitation data from space measurements N83-25280

Global weather requirements for precipitation measurements N83-25282

Sampling problems: The small scale structure of precipitation N83-25283

On the effect of temporal sampling on the observation of mean rainfall N83-25285

Raingage network sampling statistics N83-25286

Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287

The differential reflectivity dual polarization method of rainfall measurements N83-25289

A survey of radar rain measurement techniques N83-25290

Ground truth for oceanic rainfall N83-25291

Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292

A life history method for estimating convective rainfall N83-25293

A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294

Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295

The estimation of convective precipitation from GOES imagery with the Griffith/Woodley technique N83-25296

The Bristol method of satellite-improved rainfall monitoring N83-25297

Inference of precipitation through thermal infrared measurements of soil moisture N83-25298

A survey of passive microwave and hybrid remote sensing of precipitation N83-25299

Using underwater ambient noise levels to measure rainfall rate: A review N83-25302

The DMSP imager (SSMI): Unfinished plans N83-25306

Remote sensing of stored precipitation, i.e., soil moisture and snow N83-25307

Adaptively pointing spaceborne radar for precipitation measurements N83-25315

The outlook for precipitation measurements from space N83-25316

A study on the viability of preciptation forecasting in northeastern Brazil from 1 to 9 months [INPE-2628-TDL/111] N83-25318

PRECISION

An analysis of electrochemical deburring [DE82-020881] N83-24620

PREDICTION ANALYSIS TECHNIQUES

An experimental and theoretical investigation of the reduction in parachute drag caused by forebody wake effects: Data compilation and program summary [DE83-005364] N83-24486

Integrated methodology for adhesive bonded joint life predictions [AD-A124324] N83-24701

A comparative study of four major approaches to predicting ATES performance N83-24976

Supply curves of conserved energy [DE82-020066] N83-25188

PREDICTIONS

An evaluation of the pavement condition index prediction model for rigid airfield pavements [AD-A123002] N83-24524

A model for on-offshore sediment transport in the surfzone [AD-A124235] N83-25340

PRELAUNCH SUMMARIES

European X-ray observatory satellite (Exosat) [NASA-NEWS-RELEASE-83-74] N83-24532

PREPREGS

Cure monitoring and control with combined dielectric/temperature probes [AD-A123512] N83-24564

PRESIDENTIAL REPORTS

Analysis of the comprehensive energy emergency response procedures report [GAO/RCED-83-106] N83-25624

PRESSURE

A comprehensive analysis of cavitation and liquid impingement erosion data [NASA-TM-83352] N83-24634

TES technology transfer in the pulp and paper industry N83-25081

PRESSURE CHAMBERS

Large-scale pressurizable fire test facility, Fire 1 [AD-A124288] N83-24730

PRESSURE DISTRIBUTION

Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine [NASA-TM-83387] N83-25499

PRESSURE EFFECTS

Critical studies of the rapid pyrolysis and hydropyrolysis of coal [DE83-000101] N83-24596

PRESSURE MEASUREMENT

The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981

PRESSURE PULSES

Analytical modeling of transport aircraft crash scenarios to obtain floor pulses [NASA-CR-166089] N83-24488

PRESSURE REDUCTION

Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions [NASA-TM-84591] N83-24542

Dynamic fracture and depressurization in pipes [DE82-905283] N83-24914

PRESSURE SENSORS

Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models [N/FE123/S/PUB/77] N83-24517

Capacitive pressure transducers and pressure fixed points [AD-A124254] N83-24836

PRESSURE VESSELS

Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields [DE82-904603] N83-24690

Near-surface crack detection in nuclear pressure vessels [DE82-019184] N83-24871

Cycle life test and failure model of nickel-hydrogen cells [NASA-TM-83375] N83-25038

PRESTRESSING

Critical assessment of the international estimates for relaxation losses in prestressing strands [RR-CE-25] N83-24878

PRETREATMENT

Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76 [DE82-011012] N83-25231

PRINTED CIRCUITS

Capacity selector value electronics enclosure assembly controller card assembly test specifications [AD-A123539] N83-24772

Channel plating [DE82-021687] N83-24788

PRIORITIES

Development, application, and evaluation of a value-impact methodology for prioritization of reactor-safety R and D projects [DE82-906466] N83-25621

PROBABILITY THEORY

PLUNGE: A computer program for transient-event analysis [DE82-902098] N83-25419

A FORTRAN program for the level probabilities of order restricted inference [AD-A123511] N83-25477

PROBES

System and method for moving a probe to follow movements of tissue [NASA-CASE-NPO-15197-1] N83-25346

PROBLEM SOLVING

Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm [NASA-TM-83376] N83-24467

Synchronizing large systolic arrays [AD-A123374] N83-24780

Computational methods and software for ODES and their applications [DE82-020803] N83-25422

Mean values of subsolutions of elliptic and parabolic equations [AD-A124355] N83-25449

Forms of understanding in mathematical problem solving [AD-A123384] N83-25454

Two approximations of solutions of Hamilton-Jacobi equations [AD-A124359] N83-25464

Using the method-of-lines technique to solve initial-boundary-value partial differential equations [DE82-020909] N83-25472

the effect of changing step size on the accuracy of multistep formulas [DE82-020884] N83-25474

A value-assessment aid to complex decision making [DE82-905815] N83-25490

PROCESS CONTROL (INDUSTRY)

The use of test structures for reliability prediction and process control of integrated circuits and photovoltaics N83-25096

CAM highlights, FY 82 [AD-A123395] N83-25417

PROCESS HEAT

Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle [DE83-005828] N83-24723

Assessment of energy storage for solar applications N83-25076

Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080

Cost and performance of thermal storage concepts in solar thermal systems N83-25090

Low-cost process-heat recovery [DE82-016652] N83-25138

PROCESSING

Central Arkansas Energy Project. Coal to medium-Btu gas [DE82-017577] N83-25184

PRODUCT DEVELOPMENT

Alcohol/petroleum systems as fuels for diesel engines [DE82-020752] N83-24721

Development of the charge amplifier for piezoelectric accelerometer sensors [NAL-TR-749] N83-24832

Metal hydride/chemical heat pump development project N83-25068
Pelletization and roll encapsulation of phase change materials N83-25074
Advanced-fuel-cell development [DE82-021146] N83-25131
Advanced-fuel-cell development [DE82-021272] N83-25136
Lightweight Zerodur mirror technology [AD-A123538] N83-25555

PRODUCTIVITY
The impact of security controls on computing productivity [LA-9214-MS] N83-25380

PROFILOMETERS
Time effect of erosion by solid particle impingement on ductile materials [NASA-TM-83369] N83-24637

PROGRAM VERIFICATION (COMPUTERS)
Computer Software Program Plan (CSPP) [TIS-83-SDS-006] N83-25392
Jovial program verifier rugged Jovial environment [AD-A123681] N83-25402

PROGRAMMERS
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1 [AD-A123304] N83-25407

PROGRAMMING LANGUAGES
A language-oriented interactive programming environment based on compilation technology [AD-A123347] N83-25398

PROGRAMS
Overview of the Mexican-American cooperative program at the Cerro Prieto geothermal field N83-24977
US program in heavy-ion fusion [DE82-015769] N83-25568

PROJECT MANAGEMENT
SRC-1 coal-liquefaction demonstration plant project baseline assessment report [DE82-013863] N83-24627
An interactive system for project control and planning [INPE-2620-TDL/107] N83-25614
Multi-dimensional program management [AD-A123635] N83-25615

PROJECT PLANNING
SRC-1 coal-liquefaction demonstration plant project baseline assessment report [DE82-013863] N83-24627

PROJECTILES
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack [AD-A123389] N83-24485
Projectile impact ignition characteristics of propellants [AD-A122944] N83-24715
Cannon launched electromechanical control actuation system development N83-24893

PROP-FAN TECHNOLOGY
The return of the propeller airplane [SNIAS-822-111-102] N83-24501

PROPELLANT DECOMPOSITION
Propellant/material compatibility program and results: Ten-year milestones [NASA-CR-170346] N83-24710

PROPELLERS
The return of the propeller airplane [SNIAS-822-111-102] N83-24501

PROPORTIONAL COUNTERS
Sensitive and simple method for measuring wire tensions [DE82-021918] N83-24738

PROPULSION SYSTEM CONFIGURATIONS
LOX/hydrocarbon auxiliary propulsion system study [NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study [NASA-CR-171656] N83-24551

PROSTHETIC DEVICES
Orthotic devices using lightweight composite materials [NASA-CR-166105] N83-24560

PROTECTIVE COATINGS
Improved nickel base coating alloy --- oxidation resistant coatings [NASA-CASE-LEW-13834-1] N83-24639
Intumescent coating development [NASA-CR-170737] N83-24694

PROTEIN SYNTHESIS
The chemical basis for the origin of the genetic code and the process of protein synthesis [NASA-CR-170334] N83-25344

PROTON SCATTERING
Collisionally excited few-electron systems: Theoretical introduction and survey [DE82-020805] N83-25516

PSYCHOLOGICAL EFFECTS
Sleep loss effects on continuous sustained performance [AD-A122392] N83-25364

PUBLIC HEALTH
Difficulties with regression analysis of age-adjusted rates [AD-A124381] N83-25476

PULMONARY FUNCTIONS
Interaction of anti-G measures and chest wall mechanics in determining gas exchange [AD-A122297] N83-25365

PULSARS
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars [REPT-723] N83-25627

PULSE COMPRESSION
Efficient KrF-laser pulse compression [DE82-021926] N83-24848

PULSE GENERATORS
H5 fast-kicker-magnet pulser [DE82-020002] N83-24790
Energy scaling laws for the racetrack induction accelerator [AD-A123659] N83-25507

PUMPS
DOE and AID stand-alone photovoltaic activities [NASA-TM-83374] N83-25041

PUNCHED TAPES
Floppy-disk system for punched-tape reader emulation [DE82-021126] N83-25385

PURITY
Crystallinity as a selection criterion for engineering properties of high-density polyethylene [DE82-020496] N83-24706

PYRANOMETERS
Summary of solar irradiance data sessions N83-25100
Solar radiometers N83-25101
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105

PYRIMIDINES
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode [AD-A124296] N83-24580

PYROELECTRICITY
Pyroelectric detector arrays [NASA-CASE-LAR-12363-2] N83-24763

PYROHELIOMETERS
Spectroradiometer measurements in support of photovoltaic device testing N83-25103
The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105

PYROLYSIS
Mesophase behavior in carbon fiber bundles [AD-A123322] N83-24565
Critical studies of the rapid pyrolysis and hydropyrolysis of coal [DE83-000101] N83-24596
Bench-scale development of catalysts for reforming aromatic and heterocyclic hydrocarbons [DE82-015422] N83-24628
Large-block experiments in underground coal gasification N83-25116
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI [DE82-019768] N83-25144

Q

QUALITY CONTROL
Commercial Photovoltaics Measurements Workshop Proceedings [SERI/CP-214-1403] N83-25093
Diffusion length measurement and silicon quality N83-25098

QUANTITATIVE ANALYSIS
Sampling problems: The small scale structure of precipitation N83-25283

QUANTUM ELECTRONICS
Advanced electronic technology [AD-A123581] N83-24779
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions [AD-A123554] N83-24784
Solid state research [AD-A124305] N83-25592

QUANTUM THEORY
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues [INPE-2565-MD/020-PT-2] N83-25613

QUARTZ CRYSTALS
A comparison of quartz crystals grown from fused silica and from crystalline nutrient [DE82-019487] N83-25603

QUENCHING (COOLING)
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76 [DE82-011012] N83-25231

QUEUEING THEORY
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4 [AD-A123307] N83-25406
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1 [AD-A123304] N83-25407

R

RADAR ECHOES
Bistatic surface clutter resolution area at small grazing angles [AD-A123660] N83-24748

RADAR MEASUREMENT
Global weather requirements for precipitation measurements N83-25282
Sampling problems: The small scale structure of precipitation N83-25283
Raingage network sampling statistics N83-25286
A standard verification for rainfall estimation from remote platforms N83-25288
The differential reflectivity dual polarization method of rainfall measurements N83-25289
Inference of precipitation through thermal infrared measurements of soil moisture N83-25298

RADAR SCATTERING
Calculations of radar backscattering coefficient of vegetation-covered soils [E83-10291] N83-24995

RADAR TARGETS
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target [AD-A124323] N83-24755

RADAR TRACKING
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A [FAA-PM-83-19-REV-A] N83-24494

RADIAL FLOW
Performance of tornado-type wind turbines with radial inflow supply N83-25044
Understanding tandem mirror devices N83-25118

RADIATION ABSORPTION
Increasing the effective bandwidth of a laser-fusion driver [DE82-015170] N83-24847
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles [NASA-CR-170338] N83-25505

RADIATION DAMAGE
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields [DE82-904603] N83-24690
Microcircuit radiation effects databank [NASA-TM-85328] N83-24771
Experiments in high-voltage electron microscopy [DE83-005283] N83-25612

RADIATION DETECTORS
Calibration of the active radiation detector for Spacelab-One [NASA-CR-170752] N83-24833

RADIATION DISTRIBUTION
Radiation balance of soybeans grown in Brazil [INPE-2709-PRE/297] N83-25005

RADIATION EFFECTS
The ductility behavior of irradiated path alloys N83-24658
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667

Irradiation experiment status and schedule N83-24669
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program) [DE82-021943] N83-24684
Microcircuit radiation effects databank [NASA-TM-85328] N83-24771
Ocular thermal injury from intense light [AD-A122226] N83-25366
Radiolytic effects on ion exchangers during the storage of radioactive wastes [DE82-019551] N83-25533
Experiments in high-voltage electron microscopy [DE83-005283] N83-25612

RADIATION INJURIES
Ocular thermal injury from intense light [AD-A122226] N83-25366

RADIATION MEASUREMENT
Solar cell measurements N83-25109

RADIATION SHIELDING
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon [NASA-TM-84636] N83-25525

RADIATION SOURCES
Generators of coherent radiation from relativistic electrons [DE82-020370] N83-25521

RADIATION SPECTRA
Spectral response measurements for solar cells N83-25110
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars [REPT-723] N83-25627

RADIATION TOLERANCE
Microcircuit radiation effects databank [NASA-TM-85328] N83-24771

RADICALS
Laser spectroscopy of combustion intermediates [DE83-004869] N83-24590

RADII
Diameters of O type stars based on ultraviolet observations [INPE-2692-PRE/290] N83-25632

RADIO ASTRONOMY
The Brazilian Solar Physics Program and results from the energy of solar flares [INPE-2631-PRE/258] N83-25642
Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst [INPE-2672-PRE/281] N83-25644

RADIO ATTENUATION
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes [NASA-CR-170760] N83-24531

RADIO COMMUNICATION
Subsidiary radio communications tasks for workload assessment in R&D simulations. 2: Task sensitivity evaluation [AD-A122545] N83-25375

RADIO EQUIPMENT
Automation of the DMA list of lights and radio navigational aids [AD-A124199] N83-24496

RADIO FREQUENCIES
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers [AD-A123178] N83-24845

RADIO FREQUENCY INTERFERENCE
The effect of random steering vector errors in the Applebaum adaptive array [AD-A124282] N83-24743

RADIO TRANSMISSION
Performance evaluation of multihop packet radio systems [AD-A123574] N83-24754

RADIO TRANSMITTERS
ULF near fields in layered media [AD-A123669] N83-24747

RADIO WAVES
Marine atmospheric boundary layer modeling for tactical use [AD-A123317] N83-25246

RADIOACTIVE AGE DETERMINATION
Uranium disequilibrium measurements on groundwaters N83-24945
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950

RADIOACTIVE DECAY
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980) [AD-A123517] N83-25323

RADIOACTIVE ISOTOPES
Verification and improvement of a predictive model for radionuclide migration N83-24944
Uranium (VI) retardation mechanisms N83-24946
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models [DE82-006143] N83-25013

RADIOACTIVE MATERIALS
The information data bases at the Transportation Technology Center [DE82-011468] N83-25626

RADIOACTIVE WASTES
Ultrafiltration/reverse osmosis (liquid treatment systems) [DE82-020775] N83-24607
Krypton-85 storage in sputter-deposited amorphous metals [DE82-019206] N83-24678
Nuclear waste isolation, geophysics and reservoir engineering, geosciences [DE83-004044] N83-24933
Geologic systems as analogs for long-term radioactive waste isolation: Intrusive-rock/country-rock contact zones N83-24934
Iron-nickel alloys as canister material for radioactive waste disposal in underground repositories N83-24935
Coupled hydrologic-thermomechanical experiments for radioactive waste isolation N83-24936
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste N83-24937
Basis for a tentative thermohydrologic criterion for emplacement density in a nuclear waste repository N83-24938
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Sorptive diffusion in clay gels N83-24947
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Research on nuclear waste isolation at Stripa: An overview N83-24949
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
Thermomechanical properties of Stripa granite N83-24951
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Rod-type extensometers in long-term elevated temperature service N83-24953
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Chemistry of nuclear waste substances in aqueous solutions N83-24986
Waste glasses-requirements and characteristics [DE82-014855] N83-25528
Nuclear-waste disposal in geologic repositories [DE82-020176] N83-25530
Pelletized-waste-form demonstration program, October 1981 - March 1982 [DE82-015832] N83-25531
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982 [DE82-016255] N83-25532
Radiolytic effects on ion exchangers during the storage of radioactive wastes [DE82-019551] N83-25533
Disposal of liquid radioactive wastes through wells or shafts [DE82-008944] N83-25534
Modeling of nuclear waste disposal by rock melting [DE82-012798] N83-25535
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes [DE83-005635] N83-25536
The information data bases at the Transportation Technology Center [DE82-011468] N83-25626

RADIOISOTOPE BATTERIES
Welding iridium heat-source capsules for space missions [DE82-020098] N83-24865

RADIOLYSIS
Radiolytic effects on ion exchangers during the storage of radioactive wastes [DE82-019551] N83-25533

RADIOMETERS
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps [DE82-009647] N83-25017
Solar radiometers N83-25101
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
Spaceborne radar N83-25275

RADIOMETRIC CORRECTION
Amtospheric correction analysis on LANDSAT data over the Amazon region --- Manaus, Brazil [E83-10298] N83-25001

RADIOSONDES
Guidelines for correction of radiosonde-derived refractive profiles and climatologies [AD-A124351] N83-25322

RADOMES
Quasi-optic studies of dielectric radomes and lenses [AD-A124371] N83-24761

RADON
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980) [AD-A123517] N83-25323

RAILGUN ACCELERATORS
Studies of accelerated compact toruses [DE83-005488] N83-25584

RAIN
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
Combined spaceborne and conventional measurements for precipitation estimation N83-25300
Combining visible and infrared techniques with LAMMR fo. daily rainfall estimates N83-25301
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304
Satellite borne dual millimetric wave length radar N83-25309
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310

RAIN GAGES
On the effect of temporal sampling on the observation of mean rainfall N83-25285
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287
A standard verification for rainfall estimation from remote platforms N83-25288
The differential reflectivity dual polarization method of rainfall measurements N83-25289
Ground truth for oceanic rainfall N83-25291
A life history method for estimating convective rainfall N83-25293

RAINDROPS
A standard verification for rainfall estimation from remote platforms N83-25288

RAMAN SPECTRA
Efficient Raman conversion of XeC1 laser into the blue-green region [AD-A124193] N83-24843
Efficient KrF-laser pulse compression [DE82-021926] N83-24848
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer [DE82-020169] N83-24849
Theory and simulation of laser plasma coupling, 2 [DE82-020350] N83-25580

RAMAN SPECTROSCOPY
CARS diagnostics of high pressure combustion [AD-A124304] N83-24584
Microspectroscopy [DE82-020158] N83-24614
Raman investigation of the effects of fused silica fibers [AD-A123549] N83-25553

RANDOM ACCESS MEMORY
PEANUTS - the PETW data system [MAW-82-009-U] N83-24519

RANDOM NOISE
A robust ratio-threshold technique to mitigate tone and partial band jamming in coded frequency hopped communication links [AD-A123559] N83-24753

RANDOM VIBRATION
A random vibration control system for testing a single test item with multiple inputs [DE82-019973] N83-24916

RANGE SAFETY
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes [NASA-CR-170760] N83-24531

RANGELANDS
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire) [E83-10300] N83-24993

RARE GASES
Physical adsorption: Rare-gas atoms on solid surfaces [DE83-000241] N83-25519

RATES (PER TIME)
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
A standard verification for rainfall estimation from remote platforms N83-25288
A life history method for estimating convective rainfall N83-25293
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303
Difficulties with regression analysis of age-adjusted rates
[AD-A124381] N83-25476
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515

RATS
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345

RAY TRACING
Quasi-optic studies of dielectric radomes and lenses
[AD-A124371] N83-24761
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25368

RAYLEIGH WAVES
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge
[AD-A123670] N83-24776

REACTION KINETICS
CHEMSEN: A computer code for sensitivity analysis of elementary chemical reaction models
[DE82-020886] N83-24557
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex
[AD-A124302] N83-24583
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
Fuels combustion research
[AD-A123118] N83-24588
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
Exploratory study of coal-conversion chemistry
[DE82-020736] N83-24608
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034

REACTION PRODUCTS
On some derivatives of phenylethers, 2
[NASA-TM-77020] N83-24555

REACTOR DESIGN
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662

REACTOR MATERIALS
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668
Irradiation experiment status and schedule N83-24669
Fusion program research materials inventory N83-24670
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Environmental effects on properties of structural alloys N83-24672
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
Compatibility studies of structural alloys with solid breeder N83-24674

REACTOR SAFETY
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields
[DE82-904603] N83-24690
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
Near-surface crack detection in nuclear pressure vessels
[DE82-019184] N83-24871
Development, application, and evaluation of a value-impact methodology for prioritization of reactor-safety R and D projects
[DE82-906466] N83-25621

REACTOR TECHNOLOGY
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585

REACTORS
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144

REAL TIME OPERATION
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519

RECEIVERS
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192

RECIPROCATION
Silicon slicing by fixed abrasive slicing technique N83-25030

RECLAMATION
Recovery of hydrogen from hydrogen sulfide N83-25066

RECOIL IONS
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509

RECORDING
Low light level imaging design
[AD-A124283] N83-25547

RECTANGULAR GUIDES
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538

RECURSIVE FUNCTIONS
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462

RECYCLING
A decision making model for the recovery of useful material resources from wastes
[DE82-019204] N83-25620

REDOX CELLS
Single cell performance studies on the Fe/Cr Redox Energy Storage System using mixed reactant solutions at elevated temperature
[NASA-TM-83385] N83-25042

REDUCTION (CHEMISTRY)
Recovery of hydrogen from hydrogen sulfide N83-25066
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080

REDUNDANCY
A broadbased actuator concept for spaceflight application N83-24885

REEFS
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927

REELS
Tethered satellite control mechanism N83-24882

REENTRY
The evolution to a release-engage mechanism for use on the orbiter N83-24905

REENTRY VEHICLES
Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814

REFERENCE SYSTEMS
Source for reference cells N83-25106
An approved laboratory program for photovoltaic reference cell development N83-25107
Progress in the development of standad procedures for the global method of calibration of photovoltaic reference cells N83-25108
Solar cell measurements N83-25109
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111

REFINING
Safety issues related to synthetic-fuels facilities
[DE82-017671] N83-24739

REFLECTANCE
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005
A standard verification for rainfall estimation from remote platforms N83-25288
The differential reflectivity dual polarization method of rainfall measurements N83-25289
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549

REFLECTION NEBULAE
Properties of young clusters near reflection nebulae
[NASA-CR-170305] N83-25626

REFLECTOMETERS
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550

REFRACTIVITY
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766
Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25569

REFRACTORIES
Evaluation of olivine refractories for TES N83-25070

REFRACTORY METAL ALLOYS
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700

REFRIGERATING
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798
Design evaluation of an improved indirect evaporative cooling system
[DE83-900876] N83-25213

REFRIGERATORS
DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041

REGIONAL PLANNING
Geothermal development plan: Northern Arizona counties
[DE83-004878] N83-24554

REGRESSION ANALYSIS
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862
A study on the viability of preciptation forecasting in northeastern Brazil from 1 to 9 months
[INPE-2628-TDL/111] N83-25318
Estimating a family of distributions with applications to the extension of climatology
[AD-A123385] N83-25328
A FORTRAN program for isotonic regression in two independent variables
[AD-A123510] N83-25397
Difficulties with regression analysis of age-adjusted rates
[AD-A124381] N83-25476
Robust regression: A diagnostic tool
[AD-A123651] N83-25481
Percentage points and power calculations for Outlier tests in a regression situation
[AD-A124369] N83-25482

REGRESSION COEFFICIENTS
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496

REGULATIONS
Evaluation of dual-energy-use systems. Volume 1: Executive summary
[DE83-900758] N83-25196
Lessening the scope of federal coastal zone management: What's at stake
[DE83-004046] N83-25233

REGULATORS
Adjustment of design parameters for improved feedback properties in the linear quadratic regulator
[AD-A124494] N83-24782

REINFORCED PLASTICS
Silicon carbide-reinforced plastic material
[DE83-004944] N83-24570

RELATIVISTIC ELECTRON BEAMS
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
Generators of coherent radiation from relativistic electrons
[DE82-020370] N83-25521
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code
[DE82-021551] N83-25583

RELATIVISTIC PARTICLES
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles [NASA-CR-170338] N83-25505
RELEASING
The evolution fo a release-engage mechanism for use on the orbiter N83-24905
RELIABILITY
Wind-assist irrigation and electrical-power generation [DE83-900882] N83-25212
Software reliability modelling and estimation techniques [AD-A123421] N83-25414
RELIABILITY ANALYSIS
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna [DOT/FAA/PM-83/18] N83-24492
Analysis of strain gage reliability in F-100 jet engine testing at NASA Lewis Research Center N83-24829
Reliability and availability evaluation program manual [AD-A124294] N83-24869
Practical small-scale explosive seam welding N83-24896
RELIABILITY ENGINEERING
The use of test structures for reliability prediction and process control of integrated circuits and photovoltaics N83-25096
REMOTE HANDLING
Remote calibration of torque wrenches in a hostile environment [RFP-3298] N83-24831
Theoretical method for calculating relative joint geometry of assembled robot arms [NASA-TP-2155] N83-25438
REMOTE SENSING
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901
Design of the Galileo remote science pointing actuators N83-24902
Modular Airborne Remote Sampling and Sensing System (MARSSS) [DE82-005691] N83-25226
Report on the status at DSR/INPE on applying remote sensing to geology [INPE-2633-RPE/426] N83-25239
Microwave radiometry and hybrid precipitation measurements N83-25274
A life history method for estimating convective rainfall N83-25293
The Bristol method of satellite-improved rainfall monitoring N83-25297
Inference of precipitation through thermal infrared measurements of soil moisture N83-25298
A survey of passive microwave and hybrid remote sensing of precipitation N83-25299
Combined spaceborne and conventional measurements for precipitation estimation N83-25300
Using underwater ambient noise levels to measure rainfall rate: A review N83-25302
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
The DMSP imager (SSMI): Unfinished plans N83-25306
Beaufort/Bering 1979 microwave remote sensing data catalog report, 14-24 March 1979 [NASA-TM-84609] N83-25337
Needs, opportunities and strategies for a long-term oceanic sciences satellite program [NASA-CR-170275] N83-25339
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques [INPE-2710-PRE/298] N83-25437
REMOTE SENSORS
Perspectives in remote sensing in Brazil. An approach of the remote sensing applications to Earth resources surveys [E83-10290] N83-24994
Temporal image normalization [AD-A123313] N83-25010
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
Optical system [NASA-CASE-NPO-15801-1] N83-25541
Recovering intrinsic scene characteristics from images [AD-A123185] N83-25552
Remote sensing of the optical and physical densities of smoke, dust, and water clouds [AD-A124321] N83-25556
REMOTELY PILOTED VEHICLES
Remote sensing of battlefield weather conditions using unmanned air vehicles [AD-A124275] N83-25326
REMOVAL
Process for practically complete removal of hydrogen sulfide from low-pressure gases [DE83-005022] N83-24831
RESEARCH
Advanced-fuel-cell development [DE82-021146] N83-25131
Reverberation research overview [AD-A123351] N83-25501
Research on turbulence in plasma [NASA-CR-170260] N83-25561
RESEARCH AND DEVELOPMENT
NASA transmission research and its probable effects on helicopter transmission design [NASA-TM-83389] N83-24858
RESEARCH MANAGEMENT
Solid state research [AD-A124305] N83-25592
Development, application, and evaluation of a value-impact methodology for prioritization of reactor-safety R and D projects [DE82-906466] N83-25621
RESERVES
Report to the Congress: Strategic Alcohol Fuel Reserve [DE83-005454] N83-24717
Report to the Congress: Regional petroleum reserves [DE83-005270] N83-25124
RESERVOIRS
Nuclear waste isolation, geophysics and reservoir engineering, geosciences [DE83-004044] N83-24933
Reservoir engineering studies of the Cerro Prieto geothermal field N83-24980
Enhanced recovery of heavy oils with alkali N83-24987
Low-to-moderate-temperature hydrothermal reservoir engineering handbook [DE82-016282] N83-25149
Tracer theory with applications in geosciences, publication 1964 [DE83-004174] N83-25264
RESIDENTIAL ENERGY
Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities [DOE/ET-20279/185] N83-25052
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors [DOE/ET-20279/162] N83-25053
Data report for the Southwest Residential Experiment Station, December 1981 [DOE/ET-20279/184] N83-25054
Data report for the Northeast Residential Experiment Station, November 1981 [DOE/ET-20279/182] N83-25055
Los Alamos National Laboratory solar program [DE82-021760] N83-25143
Earth thermal-storage-assisted heat pump [DE82-020823] N83-25157
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview [DE82-020818] N83-25164
A comparison of laboratory and field-test measurements of heat-pump water heaters [DE82-020810] N83-25165
Maryvale Terrace: Geothermal residential district space heating and cooling [DE83-005288] N83-25175
Exclusion-list methodology for weatherization program in the Pacific Northwest [DE83-004051] N83-25234
RESIDUAL STRESS
Measurement of residual stress using the temperature dependence of ultrasonic velocity [AD-A123694] N83-25593
RESISTANCE THERMOMETERS
An automatic temperature-calibration system [DE82-021953] N83-24840
RESISTORS
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit [NASA-CASE-NPO-16021-1] N83-24769
RESONANT VIBRATION
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy [DE82-021844] N83-25515
RESOURCE ALLOCATION
Resource allocation: COPLAN/RAM system user's manual [INPE-2614-NTE/196] N83-25391
Analysis of the comprehensive energy emergency response procedures report [GAO/RCED-83-106] N83-25624
RESPIRATION
Computer-assisted system for determination of O2 consumption and Co2 production in man [AD-A122525] N83-25362
RETINA
Ocular thermal injury from intense light [AD-A122226] N83-25366
LENS* 4: A program for calculation of geometric optics of the human eye [DE83-003890] N83-25368
RETROFITTING
Passive-solar collector: A Trombe-wall retrofit guide [DE83-005189] N83-25123
Cooperative passive-solar commercial retrofit [DE83-005269] N83-25170
Geothermal heating for the Arizona Environmental Research Laboratory greenhouses [DE83-005287] N83-25177
REVERBERATION
Reverberation research overview [AD-A123351] N83-25501
REVERSE OSMOSIS
Improved field performance for reverse osmosis systems [AD-A124244] N83-24579
Ultrafiltration/reverse osmosis (liquid treatment systems) [DE82-020775] N83-24607
Desalting seawater and brackish waters: 1981 cost update [DE82-020482] N83-24629
Dickinson geothermal study [DE82-016945] N83-25018
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982 [DE82-016255] N83-25532
Summary of the ultrafiltration, reverse osmosis, and adsorbents project — for treatment of low level radioactive wastes [DE83-005635] N83-25536
REYNOLDS NUMBER
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses [NASA-TM-84363] N83-24472
Basic investigations for the use of wind tunnel models in the ETW — transonic wind tunnels [BMFT-FB-W-82-023] N83-24522
RIDING QUALITY
Ride quality systems for commuter aircraft [NASA-CR-166118] N83-24512
RIGID STRUCTURES
Behavior of nuclei at high angular momentum [DE82-020267] N83-25514
RING STRUCTURES
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending [NASA-TM-83059] N83-24874
Alternative dipole magnets for ISABELLE [DE82-020549] N83-25576
RISK
Biological effects of static magnetic fields: A selective review with emphasis on risk assessment [DE82-013350] N83-25367
ROASTING
Autoignition of kerosene in fluidized-bed pilot-plant calciners [DE82-008764] N83-24610
ROBOTS
Theoretical method for calculating relative joint geometry of assembled robot arms [NASA-TP-2155] N83-25438
ROBUSTNESS (MATHEMATICS)
Robust regression: A diagnostic tool [AD-A123651] N83-25481
Minimax robustness in communication and control — minimax robustness in communication and control [AD-A124639] N83-25489
ROCK MECHANICS
The Stiffness of Joints [TULEA-1981:22] N83-25241
ROCKET ENGINE CASES
Simulated blast testing of advance interceptor materials [AD-A124374] N83-24563
ROCKET EXHAUST
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes [NASA-CR-170760] N83-24531
ROCKET FLIGHT
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm [AD-A123703] N83-24502

ROCKS
Porous media equivalent for a network of discontinuous fractures N83-24940
Geophysical borehole measurements in low-permeability rock N83-24955
The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981
The measurement of in situ stress using NQR/NMR N83-24991
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155
Studies of earth stress and rock properties and the hydraulic-fracturing process
[DE82-016779] N83-25259
ROLLER BEARINGS
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
ROTARY WINGS
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
Limits on the prediction of helicopter rotor noise using thickness and loading sources: Validation of helicopter noise prediction techniques
[NASA-CR-166097] N83-25498
ROTATING DISKS
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
ROTATING SHAFTS
Seal performance and durability of rotating shaft seals of liquid oxygen turbopump
[NAL-TR-717] N83-24860
ROTATION
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25128
ROTOR AERODYNAMICS
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507
ROTOR BLADES (TURBOMACHINERY)
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507
RUNWAYS
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
Methyl methacylate polymer-concrete for bomb damage repair
[AD-A123346] N83-24699
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732

S

SAFETY
Mallet impact test
[DE83-001841] N83-24718
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351
SAFETY DEVICES
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489
SALINITY
Oceanographic observations North Pacific Ocean Station November and Pacific Standard Monitoring Sections P3, P4, P5, and P6, July 1966 - June 1974
[AD-A122224] N83-25342
SALIVA
Salivary and plasma testosterone and cortisol during moderately heavy excercise
[AD-A122107] N83-25352
SAMPLES
Fluid sampling and analysis of geopressured brine N83-24972
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217
SAMPLING
Conversion of existing continuous control systems into digital control systems
[AD-A123167] N83-24783
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Fluid sampling and analysis of geopressured brine N83-24972
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
Generating parallel correlated transition frequencies for a Markov chain
[AD-A124250] N83-25478
Bib designs with blocks of maximal multiplicity
[AD-A123220] N83-25492
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496
SAN FRANCISCO (CA)
San Francisco's wastewater treatmen. program needs reexamination and better management
[GAO/MASAD-83-11] N83-25220
SANDS
Enhanced recovery of heavy oils with alkali N83-24987
SANDWICH STRUCTURES
Orthotic devices using lightweight composite materials
[NASA-CR-166105] N83-24560
SATELLITE ATTITUDE CONTROL
Sampling problems N83-25271
SATELLITE CONFIGURATIONS
European X-ray observatory satellite (Exosat)
[NASA-NEWS-RELEASE-83-74] N83-24532
SATELLITE OBSERVATION
Infrared satellite technology study
[AD-A123631] N83-24536
Carbon Dioxide Effects Research and Assessment Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222
Global weather requirements for precipitation measurements N83-25282
Some statistical problems inherent in measuring precipitation N83-25284
Raingage network sampling statistics N83-25286
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295
The estimation of convective precipitation from GOES imagery with the Griffith/Woodley technique N83-25296
Needs, opportunities and strategies for a long-term oceanic sciences satellite program
[NASA-CR-170275] N83-25339
SATELLITE ORBITS
Effects of small thrust on the motion of an artificial Earth satellite
[NAL-TR-744] N83-24533
SATELLITE ORIENTATION
Determination of artificial satellite attitude by estimates of state
[INPE-2608-TDL/105] N83-24530
SATELLITE PERTURBATION
Effects of small thrust on the motion of an artificial Earth satellite
[NAL-TR-744] N83-24533
SATELLITE-BORNE INSTRUMENTS
Infrared satellite technology study
[AD-A123631] N83-24536
Perspectives in remote sensing in Brazil. An approach of the remote sensing applications to Earth resources surveys
[E83-10290] N83-24994
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
SATELLITE-BORNE RADAR
Spaceborne precipitation radar N83-25308
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310
Adaptively pointing spaceborne radar for precipitation measurements N83-25315
The outlook for precipitation measurements from space N83-25316
SATURATION
Saturation of the lower-hybrid-drift instability by mode coupling
[AD-A123569] N83-25564
SCALE EFFECT
Some exploratory considerations of scale effects on the potential performance of wood energy conversion systems
[DE83-001378] N83-25122
SCALE MODELS
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538
SCALING LAWS
Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer
[DE82-020169] N83-24849
Energy scaling laws for the racetrack induction accelerator
[AD-A123659] N83-25507
SCATTERING COEFFICIENTS
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
SCATTERING CROSS SECTIONS
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508
SCATTEROMETERS
Rain rate measurement capabilities using a Seasat type radar altimeter N83-25311
SCENE ANALYSIS
AN-A46. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997
Feature component reduction through divergence analysis
[AD-A123474] N83-25007
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
SCINTILLATION
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite
[AD-A124291] N83-25245
SEA ICE
Beaufort/Bering 1979 microwave remote sensing data catalog report, 14-24 March 1979
[NASA-TM-84609] N83-25337
SEA LEVEL
Carbon Dioxide Effects Research and Assessment Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222
SEA WATER
Uranium from seawater
[DE83-000658] N83-24595
Desalting seawater and brackish waters: 1981 cost update
[DE82-020482] N83-24629
Increase of total CO sub 2 in the world oceans
[DE83-004868] N83-25235
SEALING
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863
SEALS (STOPPERS)
Seal performance and durability of rotating shaft seals of liquid oxygen turbopump
[NAL-TR-717] N83-24860
Study on sealing characteristics of high speed, face-contact bellows mechanical seals for liquid hydrogen
[NAL-TR-750] N83-24861
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863
Practical small-scale explosive seam welding N83-24896
SEAMOUNTS
Study of the time evolution of the lithosphere
[NASA-CR-170337] N83-25238
SEAMS (JOINTS)
Practical small-scale explosive seam welding N83-24896

SEARCH PROFILES
PLUNGE: A computer program for transient-event analysis
[DE82-902096] N83-25419
SEARCHING
A game theory approach to search
[AD-A124631] N83-25486
SEAS
MONEX79 atmospheric boundary-layer experiment over the Bay of Bengal: Digha data report
[DE83-005456] N83-25335
SEASAT SATELLITES
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310
SEAT BELTS
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489
SEDATIVES
Sleep spindle and delta changes during chronic use of a short-acting and a long-acting benzodiazepine hypnotic
[AD-A123149] N83-25360
SEDIMENT TRANSPORT
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
A model for on-offshore sediment transport in the surfzone
[AD-A124235] N83-25340
SEDIMENTS
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
SEISMIC WAVES
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Energy and Technology Review
[DE83-003802] N83-25115
The Regional Seismic Test Network N83-25117
Seismic discrimination
[AD-A124322] N83-25254
SEISMOLOGY
The application of ASP: An automated seismic processor N83-24963
SELECTION
Aspects of model selection in multivariate analyses
[DE82-019576] N83-25483
SELECTIVE SURFACES
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering --- selective absorber coatings of alumina-metal-alumina
[DE83-005692] N83-24687
SELECTIVITY
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344
SEMICONDUCTING FILMS
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600
SEMICONDUCTOR DEVICES
Pyroelectric detector arrays
[NASA-CASE-LAR-12363-2] N83-24763
Advanced electronic technology
[AD-A123581] N83-24779
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes
[DE82-012700] N83-25047
SEMICONDUCTOR DIODES
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538
SEMICONDUCTOR LASERS
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
SEMICONDUCTORS (MATERIALS)
Noise and thermal contributions in transferred electron two and three terminal devices
[AD-A124326] N83-24756
Optical pumping of hot phonons in GaAs
[DE82-020519] N83-24852
Advanced concentrator cell research at Sandia National Laboratories
[DE82-005772] N83-25194
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604
SENSITIVITY
CHEMSEN: A computer code for sensitivity analysis of elementary chemical reaction models
[DE82-020886] N83-24557
SENSITIZING
Ambient temperature stress-corrosion cracking of sensitized stainless steels
[DE82-006846] N83-24679
SEPARATED FLOW
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479
SEPTUM
Two hundred passage three-way valve: Fraction collector N83-24894
SERIES (MATHEMATICS)
The r-Stirling numbers
[AD-A123472] N83-25450
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460
SERVICE LIFE
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857
Nondestructive testing of large steam-turbine rotors
[DE83-901108] N83-24870
Reliability of steam-turbine rotors. Task 1: Lifetime prediction analysis system
[DE83-901096] N83-24873
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design
[AD-A119497] N83-24880
SERVOCONTROL
System and method for moving a probe to follow movements of tissue
[NASA-CASE-NPO-15197-1] N83-25346
SHADOWGRAPH PHOTOGRAPHY
Machine classification of cloud particle types
[AD-A123402] N83-25331
SHADOWS
The distributions of measures of visibility on line segments in three dimensional spaces under Poisson shadowing processes
[AD-A123183] N83-25458
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
SHAFTS (MACHINE ELEMENTS)
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857
SHAKERS
A random vibration control system for testing a single test item with multiple inputs
[DE82-018973] N83-24916
SHALE OIL
Future availability of catalyst metals for synfuel processes
[DE82-015628] N83-24618
Safety issues related to synthetic-fuels facilities
[DE82-017671] N83-24739
Identification of data gaps and research needs for solid wastes from synfuel technologies
[DE83-000936] N83-25216
SHALES
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
SHAPES
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
On shapes
[TR-92] N83-25388
SHEAR PROPERTIES
Impact damage of composite plates
[NASA-CR-170309] N83-24558
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
Adiabatic deformation and strain localization
[AD-A123695] N83-24818
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859
SHEAR STRAIN
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240
SHEAR STRENGTH
The Stiffness of Joints
[TULEA-1981:22] N83-25241
SHEAR STRESS
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
SHELL THEORY
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907
SHOCK FRONTS
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
SHOCK LAYERS
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack
[AD-A123389] N83-24485
SHOCK WAVES
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
SHOES
Orthotic devices using lightweight composite materials
[NASA-CR-166105] N83-24560
SHORELINES
A model for on-offshore sediment transport in the surfzone
[AD-A124235] N83-25340
SHORT WAVE RADIATION
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005
SIDELOBES
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748
SIGNAL DETECTION
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745
Alternatives to optimal detection
[AD-A123454] N83-24760
SIGNAL MEASUREMENT
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite
[AD-A124291] N83-25245
SIGNAL PROCESSING
Estimating the parameters of exponentially damped or undamped sinusoidal signals in noise
[AD-A123177] N83-24750
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493
Digital ultrasonic signal processing techniques used for the clarification of ultrasonic signals
[DE82-019244] N83-25504
SIGNAL REFLECTION
Interference to television reception from large wind turbines
[BBC-RD-1983/2] N83-24741
SIGNAL TO NOISE RATIOS
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
The effect of random steering vector errors in the Applebaum adaptive array
[AD-A124282] N83-24743
Estimating the parameters of exponentially damped or undamped sinusoidal signals in noise
[AD-A123177] N83-24750
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
SIGNATURES
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
SILICA GLASS
High temperature integrated thermal storage for solar thermal applications N83-25092
SILICATES
Thermodynamic properties of silicate materials N83-24984
Enhanced recovery of heavy oils with alkali N83-24987
SILICON
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24781

Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Silicon slicing by fixed abrasive slicing technique N83-25030
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation [NASA-CR-170318] N83-25034
Diffusion length measurement and silicon quality N83-25098
Role of impurities in silicon solar cell performance N83-25099
Developments toward an 18% efficient silicon solar cell [NASA-CR-168141] N83-25112
Optical constants for silicon at 300K and 10K determined from 1.64 to 4.73 eV by ellipsometry [DE82-010062] N83-25558
Crystalline to amorphous transformation in silicon [DE83-003713] N83-25601
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors [DE83-004523] N83-25611

SILICON CARBIDES
Silicon carbide-reinforced plastic material [DE83-004944] N83-24570

SILICON COMPOUNDS
Materials for high-temperature thermoelectric conversion [NASA-CR-170316] N83-25035

SILICON DIOXIDE
Pyroelectric detector arrays [NASA-CASE-LAR-12363-2] N83-24763
Raman investigation of the effects of fused silica fibers [AD-A123549] N83-25553
Optical constants for silicon at 300K and 10K determined from 1.64 to 4.73 eV by ellipsometry [DE82-010062] N83-25558
A comparison of quartz crystals grown from fused silica and from crystalline nutrient [DE82-019487] N83-25603

SILICON FILMS
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project [NASA-CR-170213] N83-25027
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon crystal growth in vacuum N83-25031

SILICON ISOTOPES
Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas [DE82-020163] N83-25578

SILICON NITRIDES
Formation of silicon nitride structures by direct electron-beam writing [AD-A124344] N83-25588
Study of ohmic contacts on Si(28) - implanted GaAs [AD-A124689] N83-25595

SILICONES
Two hundred passage three-way valve: Fraction collector N83-24894

SILOXANES
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones [DE83-005029] N83-24709

SILVER
Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode [AD-A124296] N83-24580
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers [AD-A123178] N83-24845

SIMULATION
Evaluation of safety-parameter display concepts, volume 2 [DE82-902072] N83-24737
Simulation of plasma double-layer structures [NASA-CR-170279] N83-25563
Compact toroidal plasmas: Simulations and theory [DE82-018107] N83-25567

SINE WAVES
Estimating the parameters of exponentially damped or undamped sinusoidal signals in noise [AD-A123177] N83-24750

SINGLE CRYSTALS
Capacitive pressure transducers and pressure fixed points [AD-A124254] N83-24836
Silicon crystal growth in vacuum N83-25031
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033
Optical properties related to electrical switching of Li doped NiO crystals [AD-A124299] N83-25591

SINTERING
Advanced-fuel-cell development [DE82-021146] N83-25131

SIS (SEMICONDUCTORS)
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions [AD-A123554] N83-24784

SITE SELECTION
TNT equivalency of Pentolite hemispheres [AD-A123340] N83-24712
US Department of Energy wind turbine candidate site program: The regulatory process [DE82-018444] N83-25153
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2 [DE82-016339] N83-25185
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design [DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule [DE83-005727] N83-25201
Protecting wind access: A preliminary assessment [DE82-019128] N83-25333

SIZE DISTRIBUTION
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries [NASA-TM-83386] N83-24571

SKEWNESS
Synchronizing large systolic arrays [AD-A123374] N83-24780
The actuator duct representation of turbomachinery blade rows [CUED/A-TURBO/TR-119] N83-24859

SKIN FRICTION
A study of the effects of Lebu devices on turbulent boundary layer drag [NASA-CR-170313] N83-24469

SKIN TEMPERATURE (BIOLOGY)
Data acquisition and analysis software for thermal stress studies [AD-A122567] N83-25361

SLEEP
L-tryptophan: Effects on daytime sleep latency and the waking EEG [AD-A123633] N83-25354
Sleep spindle and delta changes during chronic use of a short-acting and a long-acting benzodiazepine hypnotic [AD-A123149] N83-25360
Sleep loss effects on continuous sustained performance [AD-A122392] N83-25364

SLEEP DEPRIVATION
Sleep loss effects on continuous sustained performance [AD-A122392] N83-25364

SLICING
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project [NASA-CR-170213] N83-25027
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon slicing by fixed abrasive slicing technique N83-25030

SLIDING
Regression analysis of traction characteristics of traction fluids [NASA-TP-2154] N83-24862

SLOPES
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays [TR-1981:49T] N83-25240

SLOT ANTENNAS
Analysis of the suspended H-waveguide and other related dielectric waveguide structures [AD-A124342] N83-24757

SLURRIES
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors [DE82-014980] N83-24825

SMOKE
Remote sensing of the optical and physical densities of smoke, dust, and water clouds [AD-A124321] N83-25556

SMOOTHING
Oak Ridge National Laboratory filtering and smoothing programs [ORNL/CSD/TM-168] N83-25386
Convergence rates for multivariate smoothing spline functions [AD-A124368] N83-25452

SNOW
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature — central Russian steppes, and high plains of Montana, North Dakota, and Canada [E83-10297] N83-25000

SNOW COVER
The DMSP imager (SSMI): Unfinished plans N83-25306

SOCIAL FACTORS
Organizational context of human factors [AD-A123435] N83-25374

SOCIOLOGY
Geothermal development plan: Cochise/Santa Cruz Counties [DE83-004880] N83-25206

SODIUM NITRATES
High temperature active heat exchanger research for latent heat storage N83-25091

SODIUM SULFUR BATTERIES
Ceramic-metal solid electrolytes [DE82-009034] N83-24591

SOFTWARE TOOLS
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide [NASA-CR-166063] N83-24544
Computer Software Program Plan (CSPP) [TIS-83-SDS-006] N83-25392
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10 [LBL-13405] N83-25394
A language-oriented interactive programming environment based on compilation technology [AD-A123347] N83-25398
Jovial program verifier rugged Jovial environment [AD-A123681] N83-25402

SOIL MOISTURE
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions --- Imperial Valley, California [NASA-TM-84317] N83-25003
The Bristol method of satellite-improved rainfall monitoring N83-25297
The DMSP imager (SSMI): Unfinished plans N83-25306

SOIL SCIENCE
Effects on soils from hot storage tanks N83-25085

SOILS
An elastic-viscoplastic constitutive model for earth materials [AD-A123393] N83-24733
Calculations of radar backscattering coefficient of vegetation-covered soils [E83-10291] N83-24995
Recent changes in the global carbon balance of tropical organic soils [DE83-006814] N83-25332

SOLAR ARRAYS
Design considerations for large space electric power systems [NASA-TM-83064] N83-24552
The 17th Aerospace Mechanisms Symposium [NASA-CP-2273] N83-24881
Space telescope: Solar array primary deployment mechanism N83-24884
Data report for the Northeast Residential Experiment Station, November 1981 [DOE/ET-20279/182] N83-25055
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982 [DE83-005489] N83-25167
Initial detailed designs for intermediate photovoltaic systems: Office building [DE83-005365] N83-25172
Intermediate photovoltaic system application experiment operational performance report. Volume 3. For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma [DE83-005379] N83-25173

SOLAR CELLS
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project [NASA-CR-170213] N83-25027

Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors
[DOE/ET-20279/162] N83-25053
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Photovoltaic measurement equipment needs. View of a prospective supplier N83-25094
Some error sources in electrical test elements for thin-film solar cells N83-25097
Role of impurities in silicon solar cell performance N83-25099
Solar cell measurements N83-25109
Spectral response measurements for solar cells N83-25110
Developments toward an 18% efficient silicon solar cell
[NASA-CR-168141] N83-25112
Los Alamos passive test cell results for the 1981-82 winter
[DE83-002948] N83-25129
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982
[DE83-005489] N83-25167
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169
Initial detailed designs for intermediate photovoltaic systems: Office building
[DE83-005365] N83-25172
Intermediate photovoltaic system application experiment operational performance report. Volume 3. For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma
[DE83-005379] N83-25173
Intermediate photovoltaic system application experiment operational performance report. Volume 4. For G. N. Wilcox Memorial Hospital, Kauai, Hawaii for June, July, and August 1982
[DE83-005380] N83-25174
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191
Advanced concentrator cell research at Sandia National Laboratories
[DE82-005772] N83-25194

SOLAR COLLECTORS
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors
[DOE/ET-20279/162] N83-25053
Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089
Passive-solar collector: A Trombe-wall retrofit guide
[DE83-005189] N83-25123
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25126
Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171
Performance testing of the Solar Kinetics T-700A solar collector
[DE83-005382] N83-25176
Catalog of automatic Sun-following trackers --- for monitoring solar radiation and alignment of solar collectors
[DE83-005529] N83-25178
Advanced concentrator cell research at Sandia National Laboratories
[DE82-005772] N83-25194
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195

SOLAR COOLING
Assessment of energy storage for solar applications N83-25076
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
SLR-PLUS version 1.0 user's manual
[DE83-004109] N83-25204

SOLAR ENERGY
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735
Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities
[DOE/ET-20279/185] N83-25052
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
Shenandoah Solar Total-Energy Project
[DE83-005244] N83-25168
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197

SOLAR ENERGY CONVERSION
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041
Data report for the Southwest Residential Experiment Station, December 1981
[DOE/ET-20279/184] N83-25054
Assessment of energy storage for solar applications N83-25076
Development of natural stratification technology N83-25078
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
Intermediate photovoltaic system application experiment operational performance report for Newman Power Station, El Paso, Texas, volume 14
[DE83-005377] N83-25130
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982
[DE83-005489] N83-25167
Technology assessment of solar-energy systems. Materials resource and hazardous materials impacts of solar deployment
[DE83-005048] N83-25215
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

SOLAR FLARES
The Brazilian Solar Physics Program and results from the energy of solar flares
[INPE-2631-PRE/258] N83-25642
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643
Electron densities in a solar flare derived from X-ray spectra
[AD-A111360] N83-25647
Energy release in solar flares
[NASA-CR-170133] N83-25649

SOLAR FLUX
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171

SOLAR FURNACES
Results of solar testing of circular foil heat-flux sensors at the White Sands solar furnace
[DE82-006282] N83-25142

SOLAR GENERATORS
Spectrophotovoltaic orbital power generation
[NASA-CR-170754] N83-25040
Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089

SOLAR HEATING
Los Alamos passive test cell results for the 1981-82 winter
[DE83-002948] N83-25129
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170
SLR-PLUS version 1.0 user's manual
[DE83-004109] N83-25204
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres
[AD-A123396] N83-25257

SOLAR MAGNETIC FIELD
Energy release in solar flares
[NASA-CR-170133] N83-25649

SOLAR PHYSICS
The Brazilian Solar Physics Program and results from the energy of solar flares
[INPE-2631-PRE/258] N83-25642
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646
Energy release in solar flares
[NASA-CR-170133] N83-25649

SOLAR PONDS (HEAT STORAGE)
Heat rejection and energy extraction within solar ponds
[DE82-009487] N83-25196

SOLAR RADIATION
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
Summary of solar irradiance data sessions N83-25100
Solar radiometers N83-25101
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
Spectroradiometer measurements in support of photovoltaic device testing N83-25103
Terrestrial solar spectral modeling N83-25104
The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105
Solar cell measurements N83-25109
Catalog of automatic Sun-following trackers --- for monitoring solar radiation and alignment of solar collectors
[DE83-005529] N83-25178
Project Biramis: Measurement of the Earth radiation budget by accelerometric satellite
[ESA-TT-761] N83-25243
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres
[AD-A123396] N83-25257
The solar radiation field at twilight below 100 KM: A spherical model
[AD-A122832] N83-25648

SOLAR RADIO BURSTS
Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst
[INPE-2672-PRE/281] N83-25644

SOLAR RADIO EMISSION
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643

SOLAR REFLECTORS
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197

SOLAR SPECTRA
Terrestrial solar spectral modeling N83-25104

SOLAR THERMAL ELECTRIC POWER PLANTS
Cost and performance of thermal storage concepts in solar thermal systems N83-25090
High temperature integrated thermal storage for solar thermal applications N83-25092

SOLAR TOTAL ENERGY SYSTEMS
Shenandoah Solar Total-Energy Project
[DE83-005244] N83-25168

SOLAR WIND
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641

SOLAR X-RAYS
Microwave and X-ray emission during an isentropic expansion and their application to solar flares
[INPE-2617-TDL/106] N83-25643

Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst
[INPE-2672-PRE/281] N83-25644

SOLID ELECTROLYTES
Ceramic-metal solid electrolytes
[DE82-009034] N83-24591
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836

SOLID LUBRICANTS
Considerations on the lubrication of spacecraft mechanisms N83-24883
Evaluation of scanning earth sensor mechanism on engineering test satellite 4 N83-24890

SOLID PROPELLANT ROCKET ENGINES
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks
[NASA-TM-82520] N83-24553

SOLID ROCKET PROPELLANTS
Propellant surveillance report LGM-30 F & G stage 1, phase G, series I, TP-H1011
[AD-A123315] N83-24713

SOLID STATE
Solid state EMC technology Development
[AD-A123705] N83-24749
Energy transfer mechanism switching in disordered solids
[AD-A123448] N83-25598

SOLID STATE DEVICES
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586
Solid state research
[AD-A124305] N83-25592

SOLID WASTES
Identification of data gaps and research needs for solid wastes from synfuel technologies
[DE83-000936] N83-25216
Waste glasses-requirements and characteristics
[DE82-014855] N83-25528

SOLIDIFICATION
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033
Mathematical modeling of TES subsystems N83-25079
A mushy zone model with an exact solution
[ORNL/CSD-91] N83-25435

SOLIDS
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
Energy transfer mechanism switching in disordered solids
[AD-A123448] N83-25598

SOLUBILITY
Cutting-fluid conservation
[Y-2250] N83-24728
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Solubility of sulfur dioxide in sulfuric acid N83-25063

SOLUTES
Program WINDOW
[DE82-020760] N83-24611

SOLVENT EXTRACTION
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823

SOLVENT REFINED COAL
Liquefaction of bituminous coals with added catalysts
[DE83-000309] N83-24600
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-009722] N83-24621
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE82-012255] N83-24624
SRC-1 coal-liquefaction demonstration plant project baseline assessment report
[DE82-013863] N83-24627
Operation of the Wilsonville Advanced Coal-Liquefaction R and D Facility, Wilsonville, Alabama
[DE83-000110] N83-25133

SOLVENTS
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574
Novel mesogenic polysiloxane solvents for gas-liquid chromatography
[DE82-020753] N83-24613
Preparation of diallyl phthalate prepolymer solutions
[DE83-005330] N83-24708

SOMMERFELD WAVES
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958

SOOT
Ionic aspects of soot formation
[DE82-020799] N83-24619

SORPTION
Uranium (VI) retardation mechanisms N83-24946
Sorptive diffusion in clay gels N83-24947
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605

SOUND FIELDS
Limits on the prediction of helicopter rotor noise using thickness and loading sources: Validation of helicopter noise prediction techniques
[NASA-CR-166097] N83-25498
Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine
[NASA-TM-83387] N83-25499

SOUND PRESSURE
Helicopter noise exposure curves for use in environmental impact assessment
[AD-A123467] N83-25500

SOUND TRANSMISSION
Dynamic behavior of particulate viscoelastic composites for sound absorption
[AD-A124272] N83-25502

SOUND WAVES
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503

SOUTH AMERICA
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999

SOYBEANS
Radiation balance of soybeans grown in Brazil
[INPE-2709-PRE/297] N83-25005

SPACE BASED RADAR
Remote sensing of stored precipitation, i.e., soil moisture and snow N83-25307
Spaceborne precipitation radar N83-25308
Satellite borne dual millimetric wave length radar N83-25309
Rain rate measurement capabilities using a Seasat type radar altimeter N83-25311
Use of combined radar and radiometer systems in space for precipitation measurement: Some ideas N83-25312
Adaptively pointing spaceborne radar for precipitation measurements N83-25315
The outlook for precipitation measurements from space N83-25316

SPACE CHARGE
Electron beam probe for charge neutralization studies of heavy ion beams
[LBL-14391] N83-25526

SPACE COOLING (BUILDINGS)
Feasibility of cogenerated district heating and cooling for North Loop project
[DE83-005654] N83-25125
Maryvale Terrace: Geothermal residential district space heating and cooling
[DE83-005288] N83-25175

SPACE EXPLORATION
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556

SPACE HEATING (BUILDINGS)
Standarized EMCS energy savings calculations
[AD-A123383] N83-24731
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Assessment of energy storage for solar applications N83-25076
Feasibility of cogenerated district heating and cooling for North Loop project
[DE83-005654] N83-25125
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170
Maryvale Terrace: Geothermal residential district space heating and cooling
[DE83-005288] N83-25175
Geothermal heating for the Arizona Environmental Research Laboratory greenhouses
[DE83-005287] N83-25177

SPACE MANUFACTURING
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 1: Executive summary
[NASA-CR-171661] N83-24526

SPACE PLATFORMS
Modular design attitude control system
[NASA-CR-170736] N83-24541

SPACE POWER REACTORS
Long titanium heat pipes for high-temperature space radiators
[DE82-014069] N83-24819
Artery heat pipes for space-power systems
[DE82-015445] N83-24822

SPACE PROCESSING
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528
Two hundred passage three-way valve: Fraction collector N83-24894

SPACE SHUTTLE BOOSTERS
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538

SPACE SHUTTLE MAIN ENGINE
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes
[NASA-CR-170760] N83-24531

SPACE SHUTTLE ORBITERS
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
Intumescent coating development
[NASA-CR-170737] N83-24694
Aerothermal environment in control surface gaps in hypersonic flow: An overview
[NASA-TM-84662] N83-24794
The manned maneuvering unit flight controller arm N83-24897
The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899
The evolution fo a release-engage mechanism for use on the orbiter N83-24905
Payload retention fittings for space shuttle payload ground handling mechanism N83-24906

SPACE SHUTTLE PAYLOADS
Rolling beam umbilical system N83-24900
Hinge latch mechanism N83-24904
The evolution fo a release-engage mechanism for use on the orbiter N83-24905
Payload retention fittings for space shuttle payload ground handling mechanism N83-24906
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646

SPACE SHUTTLES
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 1: Executive summary
[NASA-CR-171661] N83-24526
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527
High-speed machining of Space Shuttle External Tank (ET) panels
[NASA-CR-170751] N83-24537
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171656] N83-24551
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24806
Vector wind profile gust model
[NASA-CR-170762] N83-25320

SPACE STATIONS
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528

SPACE SURVEILLANCE (SPACEBORNE)
Infrared satellite technology study
[AD-A123631] N83-24536

SPACE TRANSPORTATION
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540

SPACE TRANSPORTATION SYSTEM
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379
SPACE TRANSPORTATION SYSTEM 1 FLIGHT
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538
SPACE TRANSPORTATION SYSTEM 2 FLIGHT
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
SPACE TRANSPORTATION SYSTEM 3 FLIGHT
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
SPACE TRANSPORTATION SYSTEM 4 FLIGHT
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
SPACEBORNE EXPERIMENTS
Spaceborne radar N83-25275
The Brazilian Solar Physics Program and results from the energy of solar flares
[INPE-2631-PRE/258] N83-25642
SPACEBORNE TELESCOPES
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545
SPACECRAFT CHARGING
The plasma experiment on board meteosat-F2
[AD-A123377] N83-24535
SPACECRAFT CONFIGURATIONS
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24808
SPACECRAFT CONTAMINATION
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
SPACECRAFT CONTROL
ACOSS-16 (Active Control of Space Structures)
[AD-A123540] N83-24546
ACOSS fifteen (Active Control of Space Structures)
[AD-A123530] N83-24547
SPACECRAFT INSTRUMENTS
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
SPACECRAFT LAUNCHING
European X-ray observatory satellite (Exosat)
[NASA-NEWS-RELEASE-83-74] N83-24532
SPACECRAFT LUBRICATION
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
Considerations on the lubrication of spacecraft mechanisms N83-24883
SPACECRAFT MANEUVERS
Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814
SPACECRAFT POWER SUPPLIES
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552
Welding iridium heat-source capsules for space missions
[DE82-020098] N83-24865
SPACECRAFT RADIATORS
Computer modeling of heat pipe performance
[NASA-CR-171641] N83-24806
Long titanium heat pipes for high-temperature space radiators
[DE82-014069] N83-24819
SPACECREWS
Space Physiology and Medicine
[NASA-SP-447] N83-25349
SPACELAB PAYLOADS
Calibration of the active radiation detector for Spacelab-One
[NASA-CR-170752] N83-24833
SPALLING
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
SPARK IGNITION
A critical review of pulsating combustion
[TAE-468] N83-24576
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625
SPATIAL DISTRIBUTION
Study of certain plane spiral deflecting systems of traveling-wave tubes
[DE83-005024] N83-24792
Sampling problems: The small scale structure of precipitation N83-25283
On the effect of temporal sampling on the observation of mean rainfall N83-25285
SPATIAL RESOLUTION
Precipitation data for climate diagnostics N83-25278
Some statistical problems inherent in measuring precipitation N83-25284
Digital neutron radiography using plane converters with multiwire proportional chambers
[DE82-020294] N83-25511
SPECIFIC HEAT
Modeling heat transfer in PCM's with the Budak method N83-25077
Mathematical modeling of TES subsystems N83-25079
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
SPECIFICATIONS
Proposed MIL standard and handbook: Flying qualities of air vehicles. Volume 1: Proposed MIL standard
[AD-A123674] N83-24468
Analytical studies for the H-coal process
[DE82-019835] N83-24601
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
Interface specifications for the SCR (A-7E) extended computer module
[AD-A123566] N83-25411
SPECTRAL EMISSION
Flight systems safety program
[DE82-021833] N83-25529
SPECTRAL RECONNAISSANCE
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions — Imperial Valley, California
[NASA-TM-84317] N83-25003
SPECTRAL REFLECTANCE
Spectral response measurements for solar cells N83-25110
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
SPECTRAL SENSITIVITY
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
SPECTROGRAPHS
Polarizer mechanism for the space telescope faint object spectrograph N83-24887
SPECTROMETERS
Aerosol measurements with a high resolution spectrometer. Environmental research papers
[AD-A123691] N83-25248
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25467
SPECTRORADIOMETERS
Spectroradiometer measurements in support of photovoltaic device testing N83-25103
SPECTROSCOPIC ANALYSIS
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681
Isotope-dilution analyses of the metallic elements
[DE83-004924] N83-24692
SPECTROSCOPY
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609
Aerosol measurements with a high resolution spectrometer. Environmental research papers
[AD-A123691] N83-25248
SPECTRUM ANALYSIS
Coherent conversion of the sunlight spectrum
[NASA-CR-170185] N83-25026
Data analysis using multiple filters
[DE82-021948] N83-25425
Spectral estimation: An overdetermined rational model equation approach
[AD-A123676] N83-25456
Asymptotic spectral analysis of cross-product matrices
[AD-A123438] N83-25465
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
Science and art in heavy-ion collisions
[DE82-020497] N83-25513
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577
SPENT FUELS
Wet storage of spent fuel
[DE82-014846] N83-25527
SPHERES
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811
SPHERICAL HARMONICS
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions
[AD-A123406] N83-25413
SPHEROMAKS
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
SPILLING
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
SPIN DYNAMICS
Behavior of nuclei at high angular momentum
[DE82-020267] N83-25514
SPIN STABILIZATION
Nutation Damper System N83-24895
SPIN TESTS
Flywheel evaluation at ORFEL rotor testing in FY 1982
[DE82-020825] N83-25161
SPINE
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351
Analysis of long bone and vertebral failure patterns
[AD-A123163] N83-25356
SPIRAL WRAPPING
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program
[DE82-u22078] N83-24736
SPLINE FUNCTIONS
Convergence rates for multivariate smoothing spline functions
[AD-A124368] N83-25452
SPLITTING
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
SPRAYED COATINGS
Thermal NDE method for thermal spray coatings
[DE82-020641] N83-24872
Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610
SPRAYERS
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795
SPRAYING
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
SPRINGS (WATER)
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
SPUTTERING
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
STABILITY
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
STAGNATION FLOW
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859
STAINLESS STEELS
Tribological and microstructural characteristics of ion-nitrided steels
[NASA-TM-83368] N83-24635
Microstructural development of 20 percent-cold-worked type 316 stainless steel irradiated in ORR at 250 to 500 deg C N83-24657

Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Ambient temperature stress-corrosion cracking of sensitized stainless steels
[DE82-006846] N83-24679
Electrochemical aspects of stress-corrosion crack growth
[DE82-021543] N83-24680
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel
[DE82-020501] N83-24683
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684
Electrochemical aspects of stress-corrosion cracking of sensitized stainless steels
[DE82-020003] N83-24688
Centerline cracking in electron-beam cap-to-header welds in type 304L stainless steel
[DE82-020858] N83-24689
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application
[DE82-011435] N83-24913

STANDARDIZATION
Source for reference cells N83-25106
An approved laboratory program for photovoltaic reference cell development N83-25107

STANDARDS
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
Critical assessment of the international estimates for relaxation losses in prestressing strands
[RR-CE-25] N83-24878
Progress in the development of standad procedures for the global method of calibration of photovoltaic reference cells N83-25108
Solar cell measurements N83-25109
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111
Field method for sulfide determination
[DE82-017044] N83-25227

STAR CLUSTERS
Properties of young clusters near reflection nebulae
[NASA-CR-170305] N83-25628

STATIC LOADS
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559

STATISTICAL ANALYSIS
An analysis of reports of operational errors
[AD-A123416] N83-24499
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748
Reverberation research overview
[AD-A123351] N83-25501

STATISTICAL DISTRIBUTIONS
Estimating distributed lag coefficients when there are errors in the observed time series
[AD-A123460] N83-25468
A FORTRAN program for the level probabilities of order restricted inference
[AD-A123511] N83-25477

STATISTICAL TESTS
Percentage points and power calculations for Outlier tests in a regression situation
[AD-A124369] N83-25482

STATISTICAL WEATHER FORECASTING
A study on the viability of preciptation forecasting in northeastern Brazil from 1 to 9 months
[INPE-2628-TDL/111] N83-25318

STEADY FLOW
An experimental study of the dynamics of an unsteady turbulent boundary layer
[NASA-CR-170278] N83-24816

STEADY STATE
Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156
Linear and non-linear calculations of the hose instability in the ion-focused regime
[DE82-021549] N83-25518
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571

STEAM
TES technology transfer in the pulp and paper industry N83-25081
Cost and performance of thermal storage concepts in solar thermal systems N83-25090

STEAM TURBINES
Nondestructive testing of large steam-turbine rotors
[DE83-901108] N83-24870
Reliability of steam-turbine rotors. Task 1: Lifetime prediction analysis system
[DE83-901096] N83-24873
Steam-turbine-disc cracking experience. Volume 2: Data summaries and discussion
[DE82-905834] N83-24918

STEELS
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C)
[NASA-TM-83355] N83-24638
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691
Hydrogen compatibility of steels N83-25064

STEERABLE ANTENNAS
Performance interface document for users of Tracking and Data Relay Satellite System (TDRSS) electromechanically steered antenna systems (EMSAS)
[NASA-TM-84953] N83-24545

STEERING
The effect of random steering vector errors in the Applebaum adaptive array
[AD-A124282] N83-24743

STELLAR ATMOSPHERES
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640

STELLAR EVOLUTION
Evolutionary models for SNI progenitor stars
[DE82-019939] N83-25635

STELLAR LUMINOSITY
Properties of young clusters near reflection nebulae
[NASA-CR-170305] N83-25628

STELLAR MASS ACCRETION
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars
[REPT-723] N83-25627
Evolutionary models for SNI progenitor stars
[DE82-019939] N83-25635

STELLAR RADIATION
Diameters of O type stars based on ultraviolet observations
[INPE-2692-PRE/290] N83-25632

STELLAR SPECTRA
Ultraviolet lines from emission line giants
[INPE-2690-PRE/289] N83-25633

STEREOPHONICS
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740

STEROIDS
Salivary and plasma testosterone and cortisol during moderately heavy excercise
[AD-A122107] N83-25352

STIFFNESS
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892
The Stiffness of Joints
[TULEA-1981:22] N83-25241
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351

STIMULI
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353

STIRLING CYCLE
Testing and performance characteristics of a 1-kW free piston Stirling engine
[NASA-TM-82999] N83-25036
A study of dynamic energy equations for Stirling cycle analysis
[NASA-CR-168152] N83-25043
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625

STIRRING
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805

STOCHASTIC PROCESSES
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745
Filtering of systems with nonlinearities
[AD-A124635] N83-25459
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
Stochastic differential game techniques
[AD-A124634] N83-25487

STOICHIOMETRY
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602

STORABLE PROPELLANTS
Propellant/material compatibility program and results: Ten-year milestones
[NASA-CR-170346] N83-24710

STORAGE
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Basic chemical studies related to low-temperature thermal-energy storage. Task 1: Thermo-dynamic properties and interactions of salt hydrates used as phase-change materials
[DE82-020826] N83-25162

STORAGE BATTERIES
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145

STORAGE STABILITY
Propellant surveillance report LGM-30 F & G stage 1, phase G, series I, TP-H1011
[AD-A123315] N83-24713
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530

STORAGE TANKS
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714
Development of natural stratification technology N83-25078
Effects on soils from hot storage tanks N83-25085
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163

STRAIN GAGES
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Analysis of strain gage reliability in F-100 jet engine testing at NASA Lewis Research Center N83-24829

STRAIN RATE
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911

STRANDS
Critical assessment of the international estimates for relaxation losses in prestressing strands
[RR-CE-25] N83-24878

STRATEGY
Singular differential game numerical technique and closed loop guidance and control strategies
[AD-A124625] N83-25484
Stochastic differential games with complexity constrained strategies
[AD-A124627] N83-25485
Stochastic differential game techniques
[AD-A124634] N83-25487

STRATIFICATION
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
Effect of additives on performance of hydrated salt TES systems N83-25075
Development of natural stratification technology N83-25078

STRATIGRAPHY
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921
Geoiogical studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Geologic setting of the Georges Bank Basin N83-24923
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924

Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
The Baca demonstration project N83-24967

STREAMS
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022

STRESS (PHYSIOLOGY)
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345
An assessment of the relationship between the coronary-prone (type A) behavior pattern, stress, and coronary heart disease
[AD-A122809] N83-25358

STRESS ANALYSIS
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019108] N83-24568
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643
Integrated methodology for adhesive bonded joint life predictions
[AD-A124324] N83-24701
Consolidation of axi-symmetric bodies subjected to non axi-symmetric loading
[RR-CE-20] N83-24879
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912
The measurement of in situ stress using NQR/NMR N83-24991
ABAQUS-EPGEN: A general-purpose finite-element code. Volume 1: User's manual
[DE83-900754] N83-25418
Effects of triaxial stressing on creep cavitation of grain boundaries
[DE83-004083] N83-25609

STRESS CONCENTRATION
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867

STRESS CORROSION
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys
[AD-A123693] N83-24644
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197

STRESS CORROSION CRACKING
Ambient temperature stress-corrosion cracking of sensitized stainless steels
[DE82-006846] N83-24679
Electrochemical aspects of stress-corrosion crack growth
[DE82-021543] N83-24680
Electrochemical aspects of stress-corrosion cracking of sensitized stainless steels
[DE82-020003] N83-24688
Steam-turbine-disc cracking experience. Volume 2: Data summaries and discussion
[DE82-905834] N83-24918

STRESS INTENSITY FACTORS
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending
[NASA-TM-83059] N83-24874
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914

STRESS MEASUREMENT
Measurement of residual stress using the temperature dependence of ultrasonic velocity
[AD-A123694] N83-25593

STRESS RELAXATION
Critical assessment of the international estimates for relaxation losses in prestressing strands
[RR-CE-25] N83-24878

STRESS-STRAIN RELATIONSHIPS
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443

STRESSES
Modular design attitude control system
[NASA-CR-170736] N83-24541
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911

STRONTIUM FLUORIDES
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836

STRUCTURAL ANALYSIS
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Structure of large-angle grain boundaries in metals and ceramic oxides
[DE82-022006] N83-25608

STRUCTURAL BASINS
Geologic setting of the Georges Bank Basin N83-24923
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Thermal history of the Georges Bank Basin N83-24929
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931

STRUCTURAL DESIGN
Design and fabrication of realistic adhesively bonded joints
[NASA-CR-166099] N83-24876
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083

STRUCTURAL DESIGN CRITERIA
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714
The design of single angle struts
[RR-CE-19] N83-24877

STRUCTURAL ENGINEERING
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714

STRUCTURAL PROPERTIES (GEOLOGY)
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261

STRUCTURAL VIBRATION
Structural vibration damper for corrosive or high-temperature gaseous environments
[CEGB-TDB-379] N83-24908

STRUCTURAL WEIGHT
Advanced electrical power system technology for the all electric aircraft
[NASA-TM-83390] N83-24764

STRUTS
The design of single angle struts
[RR-CE-19] N83-24877

SUBROUTINE LIBRARIES (COMPUTERS)
Text string plotting enhancements for the Tektronix advanced graphing 2 software on the ORNL Fusion Energy Division decsystem-10
[ORNL/TM-8026] N83-25387
GRAFL: A simplified graphics package
[UCRL-53239] N83-25395
SLATEC common mathematical library source file format
[DE83-005812] N83-25619

SUBSIDENCE
Subsidence modeling of the Pleasant Bayou geothermal geopressured region N83-24971

SUBSONIC SPEED
Calculation of wing response to gusts and blast waves with vortex lift effect
[NASA-CR-170340] N83-24796

SUBSTRATES
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343
Formation of silicon nitride structures by direct electron-beam writing
[AD-A124344] N83-25586
Crystal growth in substrate-confined liquids
[AD-A123386] N83-25599

SULFIDES
Stabilized lanthanum sulphur compounds — thermoelectric materials
[NASA-CASE-NPO-16135-1] N83-24572
Field method for sulfide determination
[DE82-017044] N83-25227

SULFUR
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
The sulfur-iodine thermochemical water-splitting cycle N83-25062

SULFUR DIOXIDES
Solubility of sulfur dioxide in sulfuric acid N83-25063

SULFURIC ACID
Solubility of sulfur dioxide in sulfuric acid N83-25063

SUNLIGHT
Coherent conversion of the sunlight spectrum
[NASA-CR-170185] N83-25026

SUPERCONDUCTING MAGNETS
Normal zone detectors for a large number of inductively coupled coils
[DE83-005416] N83-24789
High-field superconducting accelerator magnets
[DE82-020517] N83-25495

SUPERCONDUCTORS
Powder-metallurgy-processed A15 Nb3Al superconducting wires
[DE82-022057] N83-24682
Design and fabrication of conventional and unconventional superconductors
[NASA-CR-170753] N83-24765
High-field superconducting accelerator magnets
[DE82-020517] N83-25495
Alternative dipole magnets for ISABELLE
[DE82-020549] N83-25576

SUPERCRITICAL WINGS
Calculation of unsteady transonic potential flow over 3-dimensional wings with oscillating control surfaces
[NAL-TR-746] N83-24477

SUPERFLUIDITY
Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25589

SUPERHETERODYNE RECEIVERS
Solid state EMC technology Development
[AD-A123705] N83-24749

SUPERNOVAE
Evolutionary models for SNI progenitor stars
[DE82-019939] N83-25635

SUPERSONIC FLOW
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force)
[NAL-TR-751] N83-24475
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476

SUPPORTS
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program)
[DE82-021943] N83-24684

SURFACE FINISHING
An analysis of electrochemical deburring
[DE82-020881] N83-24620
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report
[NASA-CR-170742] N83-25537

SURFACE PROPERTIES
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
Lubricant foaming and aeration study
[AD-A124184] N83-24696
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989
Temporal image normalization
[AD-A123313] N83-25010

SURFACE REACTIONS
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617

Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605

SURFACE ROUGHNESS
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
The Stiffness of Joints
[TULEA-1981:22] N83-25241

SURFACE TEMPERATURE
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements --- Kansas and Indiana
[E83-10293] N83-24996
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature --- central Russian steppes, and high plains of Montana, North Dakota, and Canada
[E83-10297] N83-25000
Needs, opportunities and strategies for a long-term oceanic sciences satellite program
[NASA-CR-170275] N83-25339

SURFACE WATER
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters
[DE83-005711] N83-25224
Increase of total CO sub 2 in the world oceans
[DE83-004868] N83-25235

SURFACE WAVES
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341

SURVEYS
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496

SURVIVAL
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489

SUSPENSION SYSTEMS (VEHICLES)
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546

SWELLING
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel
[DE82-020501] N83-24683

SWITCHES
Design of electron-beam controlled switches
[AD-A124312] N83-24785

SWITCHING
Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551
Optical properties related to electrical switching of Li doped NiO crystals
[AD-A124299] N83-25591

SWITCHING CIRCUITS
VLSI implementation of odd-even sorter using a uniform ladder
[TR-85] N83-24767

SWITCHING THEORY
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2
[AD-A123305] N83-25408
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3
[AD-A123306] N83-25409

SYNCHRONISM
Synchronizing large systolic arrays
[AD-A123374] N83-24780

SYNCHRONOUS SATELLITES
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite
[AD-A124291] N83-25245
A life history method for estimating convective rainfall N83-25293

SYNCHROTRON RADIATION
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles
[NASA-CR-170338] N83-25505

SYNCHROTRONS
H5 fast-kicker-magnet pulser
[DE82-020002] N83-24790

SYNCLINES
Structural geology of the Moorman syncline area of western Kentucky
[DE82-022305] N83-25258

SYNOPTIC METEOROLOGY
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304
Evaluation of the synoptic and mesoscale predictive capabilities of a mesoscale atmospheric simulation system
[NASA-TM-84995] N83-25317
Synoptic meteorology, part 1
[INPE-2605-MD/021] N83-25319

SYNTAX
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10
[LBL-13405] N83-25394

SYNTHESIS (CHEMISTRY)
On some derivatives of phenylethers, 2
[NASA-TM-77020] N83-24555

SYNTHETIC APERTURE RADAR
Needs, opportunities and strategies for a long-term oceanic sciences satellite program
[NASA-CR-170275] N83-25339

SYNTHETIC FUELS
Future availability of catalyst metals for synfuel processes
[DE82-015628] N83-24618
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
Safety issues related to synthetic-fuels facilities
[DE82-017671] N83-24739
Liquid fossil-fuel technology
[DE82-020005] N83-25183
Identification of data gaps and research needs for solid wastes from synfuel technologies
[DE83-000936] N83-25216

SYNTONY
A 40 MHz - 2.2 MHz downconverter
[INPE-2607-NTE/194] N83-24770

SYSTEM EFFECTIVENESS
The DOE/NASA wind turbine data acquisition system. Part 3: Unattended power performance monitor
[NASA-CR-165540] N83-24516
Modular design attitude control system
[NASA-CR-170736] N83-24541
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740
MISE: Machine for In-System Evaluation of custom VLSI chips
[AD-A123334] N83-24773
Development of natural stratification technology N83-25078

SYSTEM FAILURES
Wind-assist irrigation and electrical-power generation
[DE83-900882] N83-25212

SYSTEMS ANALYSIS
Chemical heat pump cost effectiveness evaluation N83-25067

SYSTEMS ENGINEERING
Proposed MIL standard and handbook: Flying qualities of air vehicles. Volume 1: Proposed MIL standard
[AD-A123674] N83-24468
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries
[NASA-TM-83386] N83-24571
Development of natural stratification technology N83-25078
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379
Computer Software Program Plan (CSPP)
[TIS-83-SDS-008] N83-25392
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545

T

TABLES (DATA)
Percentage points and power calculations for Outlier tests in a regression situation
[AD-A124369] N83-25482

TAIL ASSEMBLIES
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics --- Langley 16-ft transonic tunnel tests
[NASA-TP-2158] N83-24478
Calculation of transonic potential flow around a wing-body-tail combination
[AD-A124247] N83-24482

TAKEOFF
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268

TANKS (COMBAT VEHICLES)
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design
[AD-A119497] N83-24880

TANTALUM
Case history of tantalum-weld cracking
[DE82-020358] N83-24917

TAR SANDS
Future availability of catalyst metals for synfuel processes
[DE82-015628] N83-24618

TARS
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76
[DE82-011012] N83-25231

TAUTOMERS
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609

TAYLOR SERIES
Moment series for moment estimators of the parameters of a Weibull density
[DE82-018265] N83-25473

TECHNOLOGY ASSESSMENT
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete
[AD-A123579] N83-24732
The design of single angle struts
[RR-CE-19] N83-24877
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Assessment of cool storage in commercial building applications N83-25073
Assessment of energy storage for solar applications N83-25076
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121
Report of the Department of Defense Joint Service Task Force on software problems
[AD-A123449] N83-25416

TECHNOLOGY TRANSFER
TES technology transfer in the pulp and paper industry N83-25081
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017041] N83-25179
Liquid fossil-fuel technology
[DE82-020005] N83-25183

TECHNOLOGY UTILIZATION
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
Silicon slicing by fixed abrasive slicing technique N83-25030
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Sampling problems: The small scale structure of precipitation N83-25283

TECTONICS
Geologic setting of the Georges Bank Basin N83-24923
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931

An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
TELECOMMUNICATION
National Airspace System Plan, facilities, equipment and associated development N83-24521
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742
Ground truth for oceanic rainfall N83-25291
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
TELEMETRY
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379
TELESCOPES
Latch fittings for the scientific instruments on the space telescope N83-24898
TELEVISION RECEPTION
Interference to television reception from large wind turbines
[BBC-RD-1983/2] N83-24741
TELEVISION TRANSMISSION
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740
TELLURIC CURRENTS
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959
Simple one-dimensional inversions of magnetotelluric data N83-24962
TEMPERATURE
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
TES technology transfer in the pulp and paper industry N83-25081
TEMPERATURE CONTROL
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
A comparison of laboratory and field-test measurements of heat-pump water heaters
[DE82-020810] N83-25165
TEMPERATURE DISTRIBUTION
Heat rejection and energy extraction within solar ponds
[DE82-009487] N83-25196
TEMPERATURE EFFECTS
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste N83-24937
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Rod-type extensometers in long-term elevated temperature service N93-24953
The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981
Ocular thermal injury from intense light
[AD-A122226] N83-25366
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
TEMPERATURE GRADIENTS
Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models
[N/FE123/S/PUB/77] N83-24517
Experimental and numerical studies of natural convection in a Hele-Shaw cell
[DE83-005251] N83-24824
Thermal history of the Georges Bank Basin N83-24929
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Modeling heat transfer in PCM's with the Budak method N83-25077
TEMPERATURE MEASUREMENT
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519
Validation diagnostics for defective thermocouple circuits
[DE82-012778] N83-24787
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548
TEMPERATURE PROBES
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
TEMPORAL DISTRIBUTION
On the effect of temporal sampling on the observation of mean rainfall N83-25285
TEMPORAL RESOLUTION
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287
TENSILE PROPERTIES
The tensile properties of unirradiated path A PCA N83-24655
Tensile properties and swelling of 20 percent-cold-worked type 316 stainless steel irradiated in HFIR N83-24656
The ductility behavior of irradiated path alloys N83-24658
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids
[DE83-008177] N83-24911
TENSILE STRENGTH
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Mechanical properties evaluation of some commercial beryllium materials
[DE82-020851] N83-24685
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
TENSILE STRESS
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel
[AD-A123696] N83-24643
Sensitive and simple method for measuring wire tensions
[DE82-021916] N83-24738
TENSILE TESTS
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
TERMINAL BALLISTICS
Advances in techniques for tracking and terminal state estimation of a goal seeking vehicle (The Target RV) via an optimal BMD intercept vehicle filter
[AD-A124628] N83-24548
TERRAIN
Temporal image normalization
[AD-A123313] N83-25010
Numerical simulations of atmospheric releases of heavy gases over variable terrain
[DE82-020351] N83-25225
TERRAIN ANALYSIS
Vegetation and terrain effects on digital classification of LANDSAT imagery
[AD-A124236] N83-25009
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546
TERRESTRIAL RADIATION
Terrestrial solar spectral modeling N83-25104
Project Biramis: Measurement of the Earth radiation budget by accelerometric satellite
[ESA-TT-761] N83-25243
TEST EQUIPMENT
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester
[AD-A124267] N83-24835
TEST FACILITIES
Large-scale pressurizable fire test facility, Fire 1
[AD-A124288] N83-24730
Optical components for the Nova laser
[DE82-017294] N83-24850
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171
National Aeronautics and Space Administration Authorization Act, 1983 N83-25523
Langley test highlights, 1982
[NASA-TM-84655] N83-25650
TETHERED SATELLITES
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
Tethered satellite control mechanism N83-24882
TEXTURES
Feature component reduction through divergence analysis
[AD-A123474] N83-25007
THEMATIC MAPPING
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
AN-A46. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997
LANDSAT-4 image data quality analysis for energy related applications — nuclear power plant sites
[E83-10295] N83-24998
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
THERMAL CONDUCTIVITY
Transport properties of oxygen
[NASA-RP-1102] N83-24800
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048
Mathematical modeling of TES subsystems N83-25079
Thermal conductivity of molten alkali nitrates N83-25084
Initial boundary value problems for the equations of motion of compressible viscous and heat-conductive fluids
[AD-A124382] N83-25440
THERMAL DIFFUSION
Development of natural stratification technology N83-25078
THERMAL DIFFUSIVITY
Transport properties of oxygen
[NASA-RP-1102] N83-24800
THERMAL ENERGY
Dickinson geothermal study
[DE82-016945] N83-25018
Shenandoah Solar Total-Energy Project
[DE83-005244] N83-25168
THERMAL EXPANSION
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
Crystallinity as a selection criterion for engineering properties of high-density polyethylene
[DE82-020496] N83-24706
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Control of large thermal distortions in a cryogenic wind tunnel N83-24889
Thermomechanical properties of Stripa granite N83-24951
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
Thermomechanical cavity-growth modeling
[DE82-020356] N83-25139
THERMAL INSULATION
Los Alamos passive test cell results for the 1981-82 winter
[DE83-002948] N83-25129
THERMAL MAPPING
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements — Kansas and Indiana
[E83-10293] N83-24996
THERMAL PLASMAS
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment — controlled fusion
[CEA-R-5153] N83-25562
THERMAL POLLUTION
LANDSAT-4 image data quality analysis for energy related applications — nuclear power plant sites
[E83-10295] N83-24998
Energy-related pollution of semi-tropical and tropical nearshore ecosystems
[DE83-005136] N83-25237
THERMAL PROTECTION
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542
Intumescent coating development
[NASA-CR-170737] N83-24694
THERMAL RADIATION
The Bristol method of satellite-improved rainfall monitoring N83-25297
Vertically fused face sheet performance
[AD-A123420] N83-25557
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590
THERMAL REACTORS
HFIR/FFTF irradiation experiment, final design phase N83-24651

Tensile properties and swelling of 20 percent-cold-worked type 316 stainless steel irradiated in HFIR N83-24656

THERMAL RESOURCES
Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156

THERMAL STABILITY
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698

THERMAL STRESSES
Control of large thermal distortions in a cryogenic wind tunnel N83-24689
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041
Modeling of nuclear waste disposal by rock melting
[DE82-012798] N83-25535

THERMIONIC CONVERTERS
Preliminary investigations of thermionic converters utilizing HOTEMA and DFVLR electrodes
[DE83-004107] N83-25203

THERMOCHEMICAL PROPERTIES
The sulfur-iodine thermochemical water-splitting cycle N83-25062

THERMOCHEMISTRY
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle
[DE83-005828] N83-24723
Thermal history of the Georges Bank Basin N83-24929

THERMOCLINES
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088

THERMOCOUPLES
Validation diagnostics for defective thermocouple circuits
[DE82-012778] N83-24787
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
An automatic temperature-calibration system
[DE82-021953] N83-24840
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863

THERMODYNAMIC PROPERTIES
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700
Nuclear waste isolation, geophysics and reservoir engineering, geosciences
[DE83-004044] N83-24933
Coupled hydrologic-thermomechanical experiments for radioactive waste isolation N83-24936
Basis for a tentative thermohydrologic criterion for emplacement density in a nuclear waste repository N83-24938
Research on nuclear waste isolation at Stripa: An overview N83-24949
Thermomechanical properties of Stripa granite N83-24951
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027
Silicon crystal growth in vacuum N83-25031
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Effect of additives on performance of hydrated salt TES systems N83-25075
Encapsulation and implantation studies of InP
[AD-A124388] N83-25590

THERMODYNAMICS
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity
[DE82-020758] N83-24612
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863
Energy-release rate associated with diffusional crack growth
[DE83-005564] N83-24915
Uranium (VI) retardation mechanisms N83-24946
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
Thermodynamics of high-temperature brines N83-24982
Thermodynamic properties of silicate materials N83-24984
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
Thermomechanical cavity-growth modeling
[DE82-020356] N83-25139

THERMOELECTRIC GENERATORS
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633

THERMOELECTRIC MATERIALS
Stabilized lanthanum sulphur compounds --- thermoelectric materials
[NASA-CASE-NPO-16135-1] N83-24572

THERMOELECTRIC POWER GENERATION
Materials for high-temperature thermoelectric conversion
[NASA-CR-170316] N83-25035

THERMOPHYSICAL PROPERTIES
Applications of multiproperty analysis in the prediction of complex-system thermophysical behavior
[DE82-020859] N83-24603

THERMOSPHERE
Tides in the thermosphere: A review. Environmental research papers
[AD-A124314] N83-25252

THICKNESS
Study of the time evolution of the lithosphere
[NASA-CR-170337] N83-25238

THIN FILMS
Some error sources in electrical test elements for thin-film solar cells N83-25097
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559

THIN WALLED SHELLS
A new theory of cylindrical shells
[INPE-2714-RPE/431] N83-24907

THIXOTROPY
Coal/oil thixogel fuels for diesels
[DE83-000398] N83-24719

THOMSON SCATTERING
Study of short-wavelength turbulence in dense plasmas
[DE83-004488] N83-25565

THREADS
Improved design for dynamically-loaded, threaded interfaces
[DE82-012701] N83-24867

THREE DIMENSIONAL FLOW
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code
[NASA-CR-3642] N83-24479
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24808
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853

THRUST AUGMENTATION
Proceedings: Ejector Workshop for Aerospace Applications
[AD-A124264] N83-24510
Experimental investigation of high performance, short, thrust augmenting ejectors --- V/STOL aircraft
[AD-A125529] N83-24809

THRUST BEARINGS
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855

THRUST DISTRIBUTION
Perfect bell nozzle parametric and optimization curves
[NASA-RP-1104] N83-24549

THUNDERSTORMS
Precipitation Measurements From Space: Workshop report. An element of the climate observing system study
[NASA-TM-85329] N83-25269
Summary of requirements and recommendations N83-25270
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
Global weather requirements for precipitation measurements N83-25282
On the effect of temporal sampling on the observation of mean rainfall N83-25285
Situation climatic briefs
[AD-A123369] N83-25330

THYRISTORS
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768

TIDE POWERED GENERATORS
Performance optimization of a pneumatic wave energy conversion device
[AD-A124295] N83-25114

TILES
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542

TIME DEPENDENCE
Calculation of unsteady transonic potential flow over 3-dimensional wings with oscillating control surfaces
[NAL-TR-746] N83-24477
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading
[DE83-005706] N83-24569
The bidimensional Stefan problem with convection: The time-dependent case
[AD-A124377] N83-24810
Visible and infrared techniques N83-25273
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors
[DE83-004523] N83-25611

TIME DIVISION MULTIPLEXING
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742

TIME FUNCTIONS
Modeling heat transfer in PCM's with the Budak method N83-25077

TIME MEASUREMENT
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST)
[AD-A123698] N83-24585

TIME SERIES ANALYSIS
A brief review of the present status of global precipitation estimates N83-25276
Spectral estimation: An overdetermined rational model equation approach
[AD-A123676] N83-25456
Estimating distributed lag coefficients when there are errors in the observed time series
[AD-A123460] N83-25468

TITANIUM
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602

TITANIUM ALLOYS
Fusion program research materials inventory N83-24670
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700
Long titanium heat pipes for high-temperature space radiators
[DE82-014069] N83-24819
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856

TITANIUM CARBIDES
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681

TITANIUM COMPOUNDS
Uranium from seawater
[DE83-000658] N83-24595

TITANIUM NITRIDES
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640

TITANIUM OXIDES
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600

Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610

TOKAMAK DEVICES
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577
Studies of accelerated compact toruses
[DE83-005488] N83-25584
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585

TOPOGRAPHY
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data
[DE82-009640] N83-25015
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617

TOROIDAL PLASMAS
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569
Neoclassical flows and transport in nonaxisymmetric toroidal plasmas
[DE82-021691] N83-25574

TORQUE MOTORS
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831

TORSION
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471

TOXIC HAZARDS
Technology assessment of solar-energy systems. Materials resource and hazardous materials impacts of solar deployment
[DE83-005048] N83-25215

TOXICITY
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-019722] N83-24621
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226

TRACE ELEMENTS
Experimental design of an interlaboratory study for trace metal analysis of liquid fluids --- for aerospace vehicles
[NASA-TP-2148] N83-24575
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite
[DE82-020853] N83-24615

TRACERS
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264

TRACTION
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862

TRADEOFFS
The impact of security controls on computing productivity
[LA-9214-MS] N83-25380

TRAINING DEVICES
Relative cost and training effectiveness of the 6883 F-111 converter/flight control system simulators as compared to actual equipment
[AD-A123534] N83-24523

TRAINING EVALUATION
Relative cost and training effectiveness of the 6883 F-111 converter/flight control system simulators as compared to actual equipment
[AD-A123534] N83-24523

TRAINING SIMULATORS
Relative cost and training effectiveness of the 6883 F-111 converter/flight control system simulators as compared to actual equipment
[AD-A123534] N83-24523

TRANSFER FUNCTIONS
Conversion of existing continuous control systems into digital control systems
[AD-A123167] N83-24783

TRANSFORMERS
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912

TRANSIENT HEATING
Thermal conductivity of molten alkali nitrates
N83-25084

TRANSIENT PRESSURES
Advances in transient well-testing methodology
N83-24964

TRANSITION TEMPERATURE
Vitreous enamel damping material development
[AD-A124290] N83-24697

TRANSLATIONAL MOTION
Development of translational image registration techniques
[INPE-2634-RPE-427] N83-25389

TRANSMISSION LINES
Optical time domain reflectometry fiber studies
[AD-A123682] N83-25550
Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551
Instrumentation and data acquisition for satellite testing in nuclear environments
[AD-A123560] N83-25554

TRANSMISSIONS (MACHINE ELEMENTS)
NASA transmission research and its probable effects on helicopter transmission design
[NASA-TM-83389] N83-24858
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625

TRANSMITTER RECEIVERS
Solid state EMC technology Development
[AD-A123705] N83-24749
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548

TRANSONIC FLOW
Calculation of transonic potential flow around a wing-body-tail combination
[AD-A124247] N83-24482
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack
[AD-A123389] N83-24485

TRANSONIC WIND TUNNELS
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520
Basic investigations for the use of wind tunnel models in the ETW --- transonic wind tunnels
[BMFT-FB-W-82-023] N83-24522

TRANSPORT AIRCRAFT
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490

TRANSPORT PROPERTIES
Transport characteristics of alternate supply fuels
[DE82-020246] N83-24720
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
Understanding tandem mirror devices N83-25118
The long range transport of air pollution
[DOE/EP-0037] N83-25221
Neoclassical flows and transport in nonaxisymmetric toroidal plasmas
[DE82-021691] N83-25574

TRANSPORT THEORY
Verification and improvement of a predictive model for radionuclide migration N83-24944

TRANSPORTATION
Application of remote sensing to urban studies
[INPE-2625-NTE/197] N83-25004
The information data bases at the Transportation Technology Center
[DE82-011468] N83-25626

TRAPPED MAGNETIC FIELDS
Thermal-barrier trapping current in a tandem mirror
[DE82-021695] N83-25579

TRAPPING
Thermal-barrier trapping current in a tandem mirror
[DE82-021695] N83-25579

TRAVELING SALESMAN PROBLEM
A study in parallel computation: The traveling salesman problem
[AD-A123327] N83-25455

TRAVELING WAVE TUBES
Study of certain plane spiral deflecting systems of traveling-wave tubes
[DE83-005024] N83-24792
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793

TRIAXIAL STRESSES
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729

TRIBOLOGY
Considerations on the lubrication of spacecraft mechanisms N83-24883

TRINITROTOLUENE
TNT equivalency of Pentolite hemispheres
[AD-A123340] N83-24712

TRITON
Research in planetary astronomy and operation of Mauna Kea Observatory
[NASA-CR-170246] N83-25631

TROMBE WALLS
Passive-solar collector: A Trombe-wall retrofit guide
[DE83-005189] N83-25123
Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170

TROPICAL REGIONS
Energy-related pollution of semi-tropical and tropical nearshore ecosystems
[DE83-005136] N83-25237
Recent changes in the global carbon balance of tropical organic soils
[DE83-006814] N83-25332

TROPICAL STORMS
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
Severe storms requirements for precipitation information N83-25281
Raingage network sampling statistics N83-25286

TROPOSPHERE
Interplanetary magnetic field and tropospheric circulation
[NASA-CR-170277] N83-25251
The solar radiation field at twilight below 100 KM: A spherical model
[AD-A122832] N83-25648

TRUSSES
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results
[NASA-CR-171660] N83-24527
The design of single angle struts
[RR-CE-19] N83-24877

TRYPTOPHAN
L-tryptophan: Effects on daytime sleep latency and the waking EEG
[AD-A123633] N83-25354

TUNABLE LASERS
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538

TUNGSTEN COMPOUNDS
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides
[AD-A124298] N83-24581

TUNING
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596

TURBINE BLADES
Nondestructive testing of large steam-turbine rotors
[DE83-901108] N83-24870

TURBINE PUMPS
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507
Seal performance and durability of rotating shaft seals of liquid oxygen turbopump
[NAL-TR-717] N83-24860
Study on sealing characteristics of high speed, face-contact bellows mechanical seals for liquid hydrogen
[NAL-TR-750] N83-24861

TURBINE WHEELS
Reliability of steam-turbine rotors. Task 1: Lifetime prediction analysis system
[DE83-901096] N83-24873

TURBINES
Performance optimization of a pneumatic wave energy conversion device
[AD-A124295] N83-25114
TURBOFAN ENGINES
Research and development of the turbofan engine (the 2nd phase, FJR 710)
[NAL-TR-741] N83-24508
Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine
[NASA-TM-83387] N83-25499
TURBOMACHINE BLADES
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859
TURBOPROP AIRCRAFT
The return of the propeller airplane
[SNIAS-822-111-102] N83-24501
TURBULENCE
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566
Turbulence in transient solar phenomena
[NASA-CR-170315] N83-25640
TURBULENT BOUNDARY LAYER
A study of the effects of Lebu devices on turbulent boundary layer drag
[NASA-CR-170313] N83-24469
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack
[AD-A123389] N83-24485
An experimental study of the dynamics of an unsteady turbulent boundary layer
[NASA-CR-170278] N83-24816
TURBULENT FLOW
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641
TURNING FLIGHT
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511
TWO DIMENSIONAL FLOW
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
COYOTE: A finite-element computer program for nonlinear heat-conduction problems
[DE83-003822] N83-24820
TWO PHASE FLOW
Continuum modeling of two-phase flows
[AD-A124385] N83-24812
Advances in transient well-testing methodology N83-24964

U

ULTRASONIC FLAW DETECTION
Nondestructive testing of large steam-turbine rotors
[DE83-901108] N83-24870
Reliability of steam-turbine rotors. Task 1: Lifetime prediction analysis system
[DE83-901096] N83-24873
ULTRASONIC RADIATION
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919
Digital ultrasonic signal processing techniques used for the clarification of ultrasonic signals
[DE82-019244] N83-25504
ULTRASONICS
Measurement of residual stress using the temperature dependence of ultrasonic velocity
[AD-A123694] N83-25593
ULTRAVIOLET LASERS
Efficient Raman conversion of XeCl laser into the blue-green region
[AD-A124193] N83-24843
ULTRAVIOLET RADIATION
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019298] N83-24609
Diameters of O type stars based on ultraviolet observations
[INPE-2692-PRE/290] N83-25632
ULTRAVIOLET SPECTRA
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253
Study of impurities in the tandem mirror experiment using extreme-ultraviolet spectroscopy
[DE82-020610] N83-25582
Ultraviolet lines from emission line giants
[INPE-2690-PRE/289] N83-25633
UNDERGROUND EXPLOSIONS
Instrumentation and data acquisition for satellite testing in nuclear environments
[AD-A123560] N83-25554
UNDERGROUND STORAGE
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Sorptive diffusion in clay gels N83-24947
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Research on nuclear waste isolation at Stripa: An overview N83-24949
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
Thermomechanical properties of Stripa granite N83-24951
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Chemistry of nuclear waste substances in aqueous solutions N83-24986
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530
UNDERGROUND STRUCTURES
Method for initiating an undergound combustion process
[DE82-020164] N83-24604
Technical underground-coal-gasification summation: 1982 status
[DE82-020160] N83-24605
Energy and Technology Review
[DE83-003802] N83-25115
UNDERWATER ACOUSTICS
Combining visible and infrared techniques with LAMMR for daily rainfall estimates N83-25301
Reverberation research overview
[AD-A123351] N83-25501
UNDERWATER COMMUNICATION
Impedance and current of insulated and end-grounded linear antennas in seawater
[AD-A123345] N83-24751
UNITED STATES OF AMERICA
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020
UNSTEADY FLOW
A critical review of pulsating combustion
[TAE-468] N83-24576
UPPER ATMOSPHERE
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253
URANIUM
Uranium from seawater
[DE83-000658] N83-24595
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022
URANIUM OXIDES
Uranium (VI) retardation mechanisms N83-24946
URANIUM 234
Uranium disequilibrium measurements on groundwaters N83-24945
URANIUM 238
Uranium disequilibrium measurements on groundwaters N83-24945
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
URANUS (PLANET)
Research in planetary astronomy and operation of Mauna Kea Observatory
[NASA-CR-170246] N83-25631
USER MANUALS (COMPUTER PROGRAMS)
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide
[NASA-CR-166063] N83-24544
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148
SLR-PLUS version 1.0 user's manual
[DE83-004109] N83-25204
Atmospheric transport and dispersion model: User's manual
[AD-A123352] N83-25324
Microwave laboratory computer program library
[INPE-2613-NTE/195] N83-25390
Resource allocation: COPLAN/RAM system user's manual
[INPE-2614-NTE/196] N83-25391
CEI-1 lighting computer program. Programmer's guide
[AD-A124215] N83-25399
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403
ABAQUS-EPGEN: A general-purpose finite-element code. Volume 1: User's manual
[DE83-900754] N83-25416
SUBMAP manual: Subroutine mapping program
[DE82-021836] N83-25420
USER REQUIREMENTS
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
UTAH
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps
[DE82-009647] N83-25017
UTILITIES
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675
Analysis of the effects of integrating wind turbines into a conventional utility: A case study
[PNL-1962-REV] N83-25049
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121
PLUNGE: A computer program for transient-event analysis
[DE82-902098] N83-25419

V

V/STOL AIRCRAFT
Experimental investigation of high performance, short, thrust augmenting ejectors --- V/STOL aircraft
[AD-A125529] N83-24809
VACANCIES (CRYSTAL DEFECTS)
X-ray-diffraction study of vacancies in bcc helium-3 and bcc helium-4
[DE82-020141] N83-25607
VALENCE
Uranium (VI) retardation mechanisms N83-24946
VALUE
A value-assessment aid to complex decision making
[DE82-905815] N83-25490
Development, application, and evaluation of a value-impact methodology for prioritization of reactor-safety R and D projects
[DE82-906466] N83-25621
VALUE ENGINEERING
A decision making model for the recovery of useful material resources from wastes
[DE82-019204] N83-25620
VALVES
Capacity selector value electronics enclosure assembly controller card assembly test specifications
[AD-A123539] N83-24772
VAN DE GRAAFF ACCELERATORS
The Sandia nuclear microprobe
[DE83-005363] N83-24839
VANADIUM ALLOYS
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
VAPOR DEPOSITION
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
VAPOR PHASES
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625

Negative-ion states
[DE82-020832] N83-25517

VAPORIZING
Heat-pump cool storage in a clathrate of freon
[DE82-020840] N83-25158

VECTOR ANALYSIS
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503

VECTOR SPACES
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues
[INPE-2565-MD/020-PT-2] N83-25613

VECTORS (MATHEMATICS)
Vector wind profile gust model
[NASA-CR-170762] N83-25320

VEGETATION
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire)
[E83-10300] N83-24993
Vegetation and terrain effects on digital classification of LANDSAT imagery
[AD-A124236] N83-25009
Development and testing of LANDSAT-assisted procedures for cost-effective forest management --- Clearwater National Forest, Idaho
[E83-10289] N83-25024

VELOCITY DISTRIBUTION
Mine ventilation planning: A case study N83-24990

VENTILATION
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments
[FAA-CT-83-1] N83-24805
Mine ventilation planning: A case study N83-24990
Exclusion-list methodology for weatherization program in the Pacific Northwest
[DE83-004051] N83-25234

VERMONT
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont
[DE82-010058] N83-25195

VERTEBRAE
Analysis of long bone and vertebral failure patterns
[AD-A123163] N83-25356

VERTICAL AIR CURRENTS
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268

VERTICAL FLIGHT
Computer programs for generation and evaluation of near-optimum vertical flight profiles
[NASA-CR-3688] N83-24500

VERTICAL ORIENTATION
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151

VERTICAL TAKEOFF AIRCRAFT
Proceedings: Ejector Workshop for Aerospace Applications
[AD-A124264] N83-24510

VERY LARGE SCALE INTEGRATION
VLSI implementation of odd-even sorter using a uniform ladder
[TR-85] N83-24767
MISE: Machine for In-System Evaluation of custom VLSI chips
[AD-A123334] N83-24773
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
Advanced electronic technology
[AD-A123581] N83-24779
Computational geometry on a systolic chip
[AD-A123362] N83-25382
Boolean expressions of rectilinear polygons with VLSI applications
[AD-A124691] N83-25461
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493

VIBRATION
Nonlinear transient analysis of layered composite plates
[AD-A123182] N83-24566

VIBRATION DAMPING
Structural vibration damper for corrosive or high-temperature gaseous environments
[CEGB-TDB-379] N83-24908

VIBRATION MEASUREMENT
Development of the charge amplifier for piezoelectric accelerometer sensors
[NAL-TR-749] N83-24832

VIBRATION TESTS
A random vibration control system for testing a single test item with multiple inputs
[DE82-018973] N83-24916

VIBRATIONAL SPECTRA
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253

VIKING ORBITER SPACECRAFT
A Catalog of Selected Viking Orbiter Images
[NASA-RP-1093] N83-25636

VISCOELASTIC DAMPING
Vitreous enamel damping material development
[AD-A124290] N83-24697

VISCOELASTICITY
An elastic-viscoplastic constitutive model for earth materials
[AD-A123393] N83-24733
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443

VISCOSITY
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Lubricant foaming and aeration study
[AD-A124184] N83-24696
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics
[DE82-021843] N83-24705
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798
Transport properties of oxygen
[NASA-RP-1102] N83-24800
Effect of additives on performance of hydrated salt TES systems N83-25075

VISCOUS FLOW
End-wall boundary layer measurements in a two-stage fan
[NASA-TM-83409] N83-24470
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813

VISCOUS FLUIDS
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443

VISIBILITY
The long range transport of air pollution
[DOE/EP-0037] N83-25221
Development of an airborne visibility meter
[AD-A124276] N83-25327
Estimating a family of distributions with applications to the extension of climatology
[AD-A123385] N83-25328
The distributions of measures of visibility on line segments in three dimensional spaces under Poisson shadowing processes
[AD-A123183] N83-25458

VISIBLE SPECTRUM
A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294

VISION
Three-dimensional vision system for the adaptive suspension vehicle
[AD-A124277] N83-25546

VISUAL PERCEPTION
Subjective evaluations of recent productions of television with stereophonic sound
[BBC-RD-1983/3] N83-24740
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353
The perception of objects and their functional uses
[AD-A122797] N83-25370
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552

VOIDS
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919

VOLTERRA EQUATIONS
On a Volterra equation with a locally finite measure and L infinity perturbation
[AD-A124347] N83-25446
A nonlinear volterra integrodifferential equation occurring in heat flow
[AD-A124349] N83-25448

VORTEX GENERATORS
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265

VORTEX SHEETS
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815

VORTICES
Calculation of wing response to gusts and blast waves with vortex lift effect
[NASA-CR-170340] N83-24796
Green's functions at zero viscosity
[DE83-004528] N83-25475

W

WAFERS
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon slicing by fixed abrasive slicing technique N83-25030
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033

WALLS
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735

WARFARE
Remote sensing of battlefield weather conditions using unmanned air vehicles
[AD-A124275] N83-25326

WARNING SYSTEMS
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A
[FAA-PM-83-19-REV-A] N83-24494
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265

WASHING
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823

WASHINGTON
LANDSAT-4 image data quality analysis for energy related applications --- nuclear power plant sites
[E83-10295] N83-24998
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148

WASTE DISPOSAL
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
Geologic systems as analogs for long-term radioactive waste isolation: Intrusive-rock/country-rock contact zones N83-24934
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste N83-24937
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Uranium disequilibrium measurements on groundwaters N83-24945
Sorptive diffusion in clay gels N83-24947
Research on nuclear waste isolation at Stripa: An overview N83-24949
Thermomechanical properties of Stripa granite N83-24951
Rod-type extensometers in long-term elevated temperature service N83-24953
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Injection of cold water into geothermal reservoirs N83-24968
Possible storage sites for disposal and environmental control of atmospheric carbon dioxide
[DE83-005993] N83-25229
Wet storage of spent fuel
[DE82-014848] N83-25527
Waste glasses-requirements and characteristics
[DE82-014855] N83-25528
Nuclear-waste disposal in geologic repositories
[DE82-020176] N83-25530
Pelletized-waste-form demonstration program, October 1981 - March 1982
[DE82-015832] N83-25531
Radiolytic effects on ion exchangers during the storage of radioactive wastes
[DE82-019551] N83-25533
Disposal of liquid radioactive wastes through wells or shafts
[DE82-008944] N83-25534
Modeling of nuclear waste disposal by rock melting
[DE82-012798] N83-25535

WASTE ENERGY UTILIZATION
Distilling alcohol with waste automobile heat
[DE82-018727] N83-24716
Chemical heat pump cost effectiveness evaluation N83-25067
Metal hydride/chemical heat pump development project N83-25068

Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211

WASTE HEAT
Metal hydride/chemical heat pump development project N83-25068
Low-cost process-heat recovery
[DE82-016652] N83-25138

WASTE TREATMENT
Cost of phosphate removal in municipal wastewater treatment plants
[NASA-TM-77060] N83-24573
Catalytic reduction of nitrogen dioxide
[AD-A123176] N83-24587
Ultrafiltration/reverse osmosis (liquid treatment systems)
[DE82-020775] N83-24607
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982
[DE82-016255] N83-25532
Summary of the ultrafiltration, reverse osmosis, and adsorbents project --- for treatment of low level radioactive wastes
[DE83-005635] N83-25536

WASTE UTILIZATION
Feasibility of a small central cogenerated energy facility: Energy management memorandum
[DE83-005083] N83-25211

WASTE WATER
Cost of phosphate removal in municipal wastewater treatment plants
[NASA-TM-77060] N83-24573
Injection of cold water into geothermal reservoirs N83-24968
San Francisco's wastewater treatment program needs reexamination and better management
[GAO/MASAD-83-11] N83-25220

WASTES
Two hundred passage three-way valve: Fraction collector N83-24894

WATER
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170280] N83-24711
Coal/oil thixogel fuels for diesels
[DE83-000398] N83-24719
Cost and performance of thermal storage concepts in solar thermal systems N83-25090
Field method for sulfide determination
[DE82-017044] N83-25227
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane
[AD-A123366] N83-25549
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556

WATER CIRCULATION
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048

WATER COOLED REACTORS
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions
[DE83-900751] N83-24616
HFIR/FFTF irradiation experiment, final design phase N83-24651
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
Large scale hydrogen-air detonations
[DE82-020353] N83-24722

WATER HEATING
TES technology transfer in the pulp and paper industry N83-25081
Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163
A comparison of laboratory and field-test measurements of heat-pump water heaters
[DE82-020810] N83-25165

WATER INJECTION
Injection of cold water into geothermal reservoirs N83-24968

WATER MODERATED REACTORS
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653

WATER POLLUTION
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters
[DE83-005711] N83-25224
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
Energy-related pollution of semi-tropical and tropical nearshore ecosystems
[DE83-005136] N83-25237

WATER QUALITY
Environmental monitoring
[DE82-021559] N83-25228
Agricultural requirements for precipitation measurements N83-25279

WATER RECLAMATION
Development of a condenser for the dual catalyst water recovery system
[NASA-CR-166478] N83-25372

WATER TREATMENT
Improved field performance for reverse osmosis systems
[AD-A124244] N83-24579
San Francisco's wastewater treatment program needs reexamination and better management
[GAO/MASAD-83-11] N83-25220

WATER VAPOR
Ionic aspects of soot formation
[DE82-020799] N83-24619
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170280] N83-24711

WAVE ATTENUATION
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919

WAVE DISPERSION
Quasi-optic studies of dielectric radomes and lenses
[AD-A124371] N83-24761

WAVE EQUATIONS
Periodic solutions of non-dissipatively perturbed wave equations in several space variables
[AD-A124367] N83-25453

WAVE INTERACTION
A finite element computation of the electromagnetic fields within an engine inlet model
[AD-A124684] N83-24752
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25841

WAVE PROPAGATION
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A123541] N83-24577
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503

WAVE SCATTERING
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460
Theory and simulation of laser plasma coupling, 2
[DE82-020350] N83-25580

WAVEGUIDES
Analysis of the suspended H-waveguide and other related dielectric waveguide structures
[AD-A124342] N83-24757
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system compaction and integration
[NASA-CR-170344] N83-25538

WAVELENGTHS
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer
[DE82-020169] N83-24849

WEAK ENERGY INTERACTIONS
Electroweak interactions
[DE82-020146] N83-25494

WEAPON SYSTEM MANAGEMENT
Multi-dimensional program management
[AD-A123635] N83-25615

WEAPON SYSTEMS
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm
[AD-A123703] N83-24502
Reliability and availability evaluation program manual
[AD-A124294] N83-24869
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249
Report of the Department of Defense Joint Service Task Force on software problems
[AD-A123449] N83-25416

WEAR
Tribological and microstructural characteristics of ion-nitrided steels
[NASA-TM-83368] N83-24635
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700
Study on sealing characteristics of high speed, face-contact bellows mechanical seals for liquid hydrogen
[NAL-TR-750] N83-24861
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864

WEAR INHIBITORS
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640

WEATHER
Intermediate photovoltaic system application experiment operational performance report for Newman Power Station, El Paso, Texas, volume 14
[DE83-005377] N83-25130
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982
[DE83-005489] N83-25167
Situation climatic briefs
[AD-A123369] N83-25330

WEATHER FORECASTING
Agricultural requirements for precipitation measurements N83-25279
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295
The estimation of convective precipitation from GOES imagery with the Griffith/Woodley technique N83-25296
Synoptic meteorology, part 1
[INPE-2605-MD/021] N83-25319
Basic techniques in environmental simulation
[AD-A123342] N83-25325
Weather forecast adjustment using model output cloud fields and digital satellite data
[AD-A123702] N83-25329

WEATHER RECONNAISSANCE AIRCRAFT
Remote sensing of battlefield weather conditions using unmanned air vehicles
[AD-A124275] N83-25326

WEATHERPROOFING
Exclusion-list methodology for weatherization program in the Pacific Northwest
[DE83-004051] N83-25234

WEIBULL DENSITY FUNCTIONS
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25487
Moment series for moment estimators of the parameters of a Weibull density
[DE82-018265] N83-25473

WEIGHT REDUCTION
Advanced electrical power system technology for the all electric aircraft
[NASA-TM-83390] N83-24764

WELD STRENGTH
Centerline cracking in electron-beam cap-to-header welds in type 304L stainless steel
[DE82-020858] N83-24689

WELDED JOINTS
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24564
The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24685

WELDED STRUCTURES
Effective use of weld metal yield strength for HY-steels
[AD-A124234] N83-24642
Flight systems safety program
[DE82-021833] N83-25529

WELLS
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf
[USGS-CIRC-861] N83-24921

Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Advances in transient well-testing methodology N83-24964
Low- to moderate-temperature hydrothermal reservoir engineering research N83-24965
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
Injection of cold water into geothermal reservoirs N83-24968
Simulation of thermal energy storage in a doublet well system N83-24973
Geologic model of the Cerro Prieto geothermal field N83-24978
Enhanced recovery of heavy oils with alkali N83-24987
Potential of utilization of geothermal energy in Arizona [DE83-004875] N83-25119
Advanced wellbore thermal simulator GEOTEMP2 research report [DE82-020050] N83-25154
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada [DE82-019935] N83-25261
Induced fractures: Well stimulation through fracturing [DE82-019554] N83-25262
Disposal of liquid radioactive wastes through wells or shafts [DE82-008944] N83-25534

WETTABILITY
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries [NASA-TM-83386] N83-24571

WHEATSTONE BRIDGES
Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models [N/FE123/S/PUB/77] N83-24517

WHEELCHAIRS
Orthotic devices using lightweight composite materials [NASA-CR-166105] N83-24560

WHITE DWARF STARS
Evolutionary models for SNI progenitor stars [DE82-019939] N83-25635

WILDLIFE
LANDSAT-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska [AD-A123440] N83-25011

WIND PROFILES
Vector wind profile gust model [NASA-CR-170762] N83-25320

WIND SHEAR
Summary Proceedings of a Wind Shear Workshop [NASA-CP-2270] N83-25265
Significant events in low-level flow conditions hazardous to aircraft [NASA-TM-82522] N83-25268

WIND TUNNEL APPARATUS
Langley test highlights, 1982 [NASA-TM-84655] N83-25650

WIND TUNNEL CALIBRATION
Rotary target v-block — wind tunnel apparatus [NASA-CASE-LAR-12007-3] N83-25542

WIND TUNNEL MODELS
Parameter and design studies for the use of wind tunnel models in the ETW [MBB/FE123/S/PUB/83] N83-24518
Basic investigations for the use of wind tunnel models in the ETW — transonic wind tunnels [BMFT-FB-W-82-023] N83-24522

WIND TUNNEL TESTS
Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses [NASA-TM-84573] N83-24471
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force) [NAL-TR-751] N83-24475
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics — Langley 16-ft transonic tunnel tests [NASA-TP-2156] N83-24478
Performance of tornado-type wind turbines with radial inflow supply N83-25044
Langley test highlights, 1982 [NASA-TM-84655] N83-25650

WIND TUNNEL WALLS
An experimental study of blockage effects on some bluff profiles [RR-CE-23] N83-24803

WIND TURBINES
The DOE/NASA wind turbine data acquisition system. Part 3: Unattended power performance monitor [NASA-CR-165540] N83-24516
Interference to television reception from large wind turbines [BBC-RD-1983/2] N83-24741
Performance of tornado-type wind turbines with radial inflow supply N83-25044
Analysis of the effects of integrating wind turbines into a conventional utility: A case study [PNL-1962-REV] N83-25049
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis [DE82-015600] N83-25151
Wind-turbine-performance assessment [DE82-905261] N83-25152
US Department of Energy wind turbine candidate site program: The regulatory process [DE82-018444] N83-25153
Wind-assist irrigation and electrical-power generation [DE83-900882] N83-25212

WIND VANES
Miniature electro-optical air flow sensor [NASA-CASE-LAR-13065-1] N83-25539

WIND VELOCITY
Analysis of the effects of integrating wind turbines into a conventional utility: A case study [PNL-1962-REV] N83-25049
Diurnal variability of wind velocity increase with height [DE83-005604] N83-25336

WIND VELOCITY MEASUREMENT
Assessment of surface wave effects on upper ocean parameters [AD-A124637] N83-25341

WINDPOWER UTILIZATION
Wind-energy program [DE82-014199] N83-25150
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis [DE82-015600] N83-25151
Wind-turbine-performance assessment [DE82-905261] N83-25152
US Department of Energy wind turbine candidate site program: The regulatory process [DE82-018444] N83-25153
Protecting wind access: A preliminary assessment [DE82-019128] N83-25333

WINDPOWERED GENERATORS
Wind-energy program [DE82-014199] N83-25150
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis [DE82-015600] N83-25151
Protecting wind access: A preliminary assessment [DE82-019128] N83-25333

WINDPOWERED PUMPS
Wind-assist irrigation and electrical-power generation [DE83-900882] N83-25212

WINDSHIELDS
Visual judgments of optical distortions in aircraft windscreens [AD-A124307] N83-24503

WINGS
Calculation of wing response to gusts and blast waves with vortex lift effect [NASA-CR-170340] N83-24796
Design and fabrication of realistic adhesively bonded joints [NASA-CR-166099] N83-24876

WINTER
Los Alamos passive test cell results for the 1981-82 winter [DE83-002948] N83-25129
Earth thermal storage for enhanced performance of air-to-air heat pumps [DE83-020773] N83-25156
Structure and dynamics of the winter polar cap F region [AD-A123706] N83-25247

WIRE
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks [NASA-TM-82520] N83-24553
Powder-metallurgy-processed A15 Nb3Al superconducting wires [DE82-022057] N83-24682
Sensitive and simple method for measuring wire tensions [DE82-021918] N83-24738
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029

WISCONSIN
Acid rain: A background report [DE83-901079] N83-25236

WOOD
Some exploratory considerations of scale effects on the potential performance of wood energy conversion systems [DE83-001378] N83-25122

WORKING FLUIDS
Cutting-fluid conservation [Y-2250] N83-24728
Cutting-fluid conservation [DE82-009655] N83-24731
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films [DE82-021108] N83-24821

WORKLOADS (PSYCHOPHYSIOLOGY)
Calibrator for an electromagnetically braked bicycle ergometer [AD-A122511] N83-25363
Subsidiary radio communications tasks for workload assessment in R&D simulations. 2: Task sensitivity evaluation [AD-A122545] N83-25375

WRENCHES
Remote calibration of torque wrenches in a hostile environment [RFP-3298] N83-24831

X

X RAY ANALYSIS
Relations between mirror flats geometry and X-ray data [NASA-CR-170750] N83-25544
X-ray-diffraction study of vacancies in bcc helium-3 and bcc helium-4 [DE82-020141] N83-25607

X RAY ASTRONOMY
European X-ray observatory satellite (Exosat) [NASA-NEWS-RELEASE-83-74] N83-24532
The Pinhole/Occulter Facility [NASA-TP-2168] N83-25646

X RAY ASTROPHYSICS FACILITY
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report [NASA-CR-170742] N83-25537

X RAY SCATTERING
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center [NASA-CR-170749] N83-25543

X RAY SPECTRA
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars [REPT-723] N83-25627

X RAY SPECTROSCOPY
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989

X RAY TELESCOPES
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report [NASA-CR-170742] N83-25537

XENON
Photoemission of Xe and Kr adsorbed on the W(110) plane [AD-A123580] N83-24586
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite [DE82-019349] N83-25605

Y

YEAST
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats [NASA-CR-170332] N83-25343

YIELD
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Wind-assist irrigation and electrical-power generation [DE83-900882] N83-25212

YIELD STRENGTH
Effective use of weld metal yield strength for HY-steels [AD-A124234] N83-24642

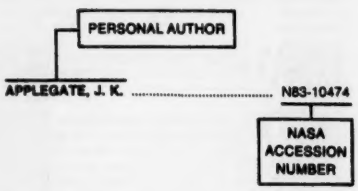
Z

ZAIRE
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire) [E83-10300] N83-24993

ZINC COMPOUNDS
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
ZIRCALOYS (TRADEMARK)
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program
[DE82-022078] N83-24736
ZIRCONIUM
Improved nickel base coating alloy --- oxidation resistant coatings
[NASA-CASE-LEW-13834-1] N83-24639

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

ABASHIAN, M. N83-24934
ABBEY, K. M. N83-24571
ABEELE, W. V. N83-25336
ABELSON, H. F. N83-25069
ABUL-FADL, A. N83-25586
ACEVEDO, W. N83-25011
ADAMS, K. N83-24487
ADAMSON, A. W. N83-24583
ADDISS, R. R., JR. N83-25106
ADELFANG, S. I. N83-25320
ADLER-GOLDEN, S. M. N83-25253
ADLER, R. F. N83-25270
N83-25273
N83-25281
AHEARN, J. S. N83-24703
AHL, E. L., JR. N83-24891
AHMADI-BEFRUI, B. N83-24868
AIDA, T. N83-24623
AKASOFU, S. I. N83-25249
AKISHITA, S. N83-24903
ALARIO, J. N83-25091
ALEXANDER, J. I. N83-24730
ALEXANDER, M. B. N83-25268
ALEXIADES, V. N83-25435
ALLEN, C. L. N83-25062
ALLEN, G. R. N83-24851
ALLEN, J. N83-25493
ALLEN, R. G. N83-25366
ALLEN, S. L. N83-25570
ALLISON, L. J. N83-25000
ALS-NIELSEN, J. N83-25605
ALTHAUS, R. N83-25576
ALVIN, M. A. N83-24598
AMIN, S. P. N83-24512
ANASTASIA, L. J. N83-25231
ANDERSEN, W. H. N83-24715
ANDERSON, D. E., JR. N83-25648
ANDERSON, D. P. N83-25447
ANDERSON, D. V. N83-25567
ANDERSON, J. N83-25604
ANDERSON, J. E. N83-24997
ANDERSON, R. C. N83-24930
ANDERSON, S. B. N83-25023
ANDERSSON, L. N83-24950
ANDERSSON, S. N83-25048
ANDRE, R. G. B. N83-25005
ANDREWS, T. W. N83-25346
APELT, C. J. N83-24802
APPS, J. A. N83-24935
N83-24947
N83-24983
ARANHA, H. N83-25390
ARCOUMANIS, C. N83-24868
ARGO, H. N83-25232
ARGON, A. S. N83-24677
ARIS, R. N83-24594
ARJUNAN, M. N83-24499
ARKIN, P. A. N83-25278
ARMENTANO, T. V. N83-25332
ARMSTRONG, R. A. N83-25253
ARONS, R. M. N83-25131
N83-25136
ARTHUR, M. A. N83-24924
N83-24929
ASBURY, J. G. N83-25073
ASHFORD, R. L. N83-24484
ASHKENAS, I. L. N83-24468
ATAC, M. N83-24738
ATLAS, D. N83-25269
N83-25275
N83-25298
N83-25315
N83-25316
AUBLE, R. L. N83-25508
AUBRUN, J. N. N83-24888
AUDENAERDE, K. N83-25570
AUGUSTINE, J. A. N83-25288
AUSTIN, G. L. N83-25294
AUTRUONG, T. N83-24759
AYERS, D. L. N83-25166
AZRIN, M. N83-24818

B

BABELAY, E. F., JR. N83-25161
BAEDER, G. N83-24574
BAES, C. F., III N83-25013
BAHRI, A. N83-25439
BAILARD, J. A. N83-25340
BAILEY, W. J. N83-25527
BAINBRIDGE, B. L. N83-25142
BAITY, W. A. N83-25646
BAJAJ, R. N83-24659
BAKER, P. C. N83-24850
BALADI, G. Y. N83-24733
BALCOMB, J. D. N83-25129
BALDWIN, D. E. N83-25570
BALESTRINI, S. J. N83-25393
BALL, C. L. N83-24470
BALL, J. B. N83-25508
BALL, R. H. N83-25221
BALLANTYNE, J. N83-24778
BALLARD, D. H. N83-25388
BALLUFFI, R. W. N83-25608
BALZER, E. T., JR. N83-25224
BANDEEN, W. R. N83-25274
BANGERTER, R. O. N83-25568
BARBER, G. C. N83-25593
BARE, E. A. N83-24478
BARKER, L. K. N83-25438
BARLOW, J. N83-25502
BARNUM, B. M. N83-24675
BARR, K. P. N83-25089
BARR, W. L. N83-25570
BARRETT, C. A. N83-24639
BARRETT, E. C. N83-25273
N83-25297
BARRETT, M. F. N83-24546
BARRETT, T. N83-25392
BARTHEL, J. N83-24574
BASU, S. N83-25245
N83-25245
BATES, J. F. N83-24683
BATTALINO, T. E. N83-25323
BAUER, E. N83-24555
BAUGHMAN, R. J. N83-25603
BEAN, S. J. N83-25328
BEAVER, B. N83-25350
BECKER, F. L. N83-24871
BECKER, M. N83-24601
BECKER, R. L. N83-25516
BEDINGER, A. F. G. N83-25159
BEERS, D. N83-25195
BEHANNON, K. W. N83-25639
BEJAN, A. N83-24817
BELL, A. T. N83-24825
BELL, T. L. N83-25271
BELLINGER, F. O. N83-25078
BELSKY, L. E. N83-25467
BEMENT, L. J. N83-24896
BENDORAITIS, J. G. N83-24601
BENEDICK, W. B. N83-24722
BENNETT, B. L. N83-25352
BENSON, J. W. N83-24515
BENSON, L. V. N83-24944
BENSON, S. M. N83-24964
N83-24965
N83-24966
BENTLEY, C. N83-25222
BERARDO, P. A. N83-25420
BERECEK, E. M. N83-25325
BEREMAND, D. G. N83-25625
BERESTYCKI, H. N83-25439
BERGE, L. H. N83-24828
BERGER, D. N83-24501
BERKNER, K. H. N83-25509
BERNANDER, S. N83-25240
BERNDT, C. C. N83-25610
BERRY, L. A. N83-25571
BERTRAND, F. E. N83-25508
BERTRAND, P. A. N83-25600
BESENBRUCH, G. E. N83-24723
N83-25062
BEY, K. S. N83-24794
BEYER, H. F. N83-25509
BICEN, A. F. N83-24868
BIDASARIA, H. B. N83-25525
BIFANO, W. J. N83-25041
BINNALL, E. N83-24953
BIRD, R. E. N83-25104
BISIANI, R. N83-24773
BITER, W. J. N83-25191
BJORKLAND, R. N83-24710
BJORKLUND, G. C. N83-24846
BLACK, R. I. N83-24741
BLACK, S. N83-24633
BLACKETT, R. E. N83-25261
BLACKMER, R. N83-25272
BLAKE, G. A. N83-25630
BLAND, T. L. N83-25500
BLICK, D. W. N83-25345
BLOCH, M. G. N83-24601
BLOCK, H. W. N83-25466
BLOUNT, D. H. N83-24549
BODVARSSON, G. S. N83-24964
N83-24965
N83-24967
N83-24968
N83-24969
N83-24970
N83-24976
BOERNER, W. M. N83-25275
N83-25313
BOGDAN, E. J. N83-24762
BOHR, J. N83-25605
BOLDISH, S. I. N83-24582
BOMAR, E. S. N83-25021
BOND, W. H. N83-24607
BOOKER, J. R. N83-24879
BORGES, H. G. V. S. N83-25391
BORGIOTTI, G. V. N83-24751
BOROVSKY, J. E. N83-25563
BOSSART, S. J. N83-25231
BOULTINGHOUSE, K. D. N83-25171
BOWMAN, H. R. N83-24992
BOWMAN, K. O. N83-25473
BOYD, D. W. N83-25121
BOYLE, P. J. N83-25246
BRACKETT, W. B. N83-25399
BRADEN, R. P. N83-24510
BRAINARD, W. A. N83-24636
BRANSKY, J. N83-25591
BRASKI, D. N. N83-24654
N83-24655
N83-24660
N83-24661
BRAUNSTEIN, J. N83-25162
BREAUX, H. J. N83-24502
BRECKENRIDGE, R. N83-24763
BRECKINRIDGE, J. B. N83-25541
BREISACHER, P. N83-24587
BRETZ, P. E. N83-24910
BRICKELL, E. F. N83-25423
BRIL, G. N83-25397
BRILL, K. N83-25317

BRINGI, V. N. N83-25272
N83-25289
BRISCOE, M. N83-24883
BRISTOWE, P. D. N83-25608
BRITTON, D. L. N83-24571
BRITTON, K. H. N83-25411
BRODER, A. Z. N83-25450
BROGLIO, E. P. N83-25137
BROKMAN, A. N83-25608
BRONISZ, S. E. N83-25529
BROOKE, R. W. N83-24481
BROOKINS, D. N83-24934
BROSNAN, D. A. N83-24704
BROUSSARD, R. M. N83-25647
BROWER, D. A. N83-25246
BROWN, J. N83-25011
BROWN, L. C. N83-24723
N83-25062
BROWN, N. J. N83-24850
BROWN, S. N83-25223
BROWN, T. N83-25123
BROWN, W. T. N83-25170
BRUCKNER, A. P. N83-25092
BRULE, M. R. N83-24603
BRYAN, J. B. N83-24850
BUCHANAN, H. L. N83-25518
BUCHAU, J. N83-25247
BUCHELE, D. R. N83-24509
BUCKLEY, D. H. N83-24637
N83-24641
N83-24695
N83-24856
BUCKLEY, O. E. N83-25121
BUDINIKAS, P. N83-25372
BUECHLER, M. N83-24565
BUEHLER, M. G. N83-24769
BUFFINGTON, A. N83-25634
BULMER, R. H. N83-25581
BURCHARD, H. G. N83-25445
BURGHARD, H. C., JR. N83-24918
BURKE, H. H. K. N83-25274
N83-25304
BURKE, K. A. N83-25059
BURR, N. C. N83-25425
BUSCH, G. E. N83-24847
BUSCHECK, T. A. N83-24973
N83-24975
N83-24976
BUTZ, T. R. N83-25021

C

CABAL, A. V. N83-24601
CADY, W. E. N83-24709
CADZOW, J. A. N83-25456
CAHEN, G. L., JR. N83-25060
CAIAFA, C. A. N83-24489
CALABRESE, S. J. N83-24698
CALLEN, J. D. N83-25574
N83-25579
CALLEN, R. B. N83-24601
CALM, J. M. N83-25073
CALVERT, J. N83-24905
CALVIN, M. N83-25334
CAMP, D. W. N83-25265
N83-25268
CAMPBELL, E. M. N83-24849
CAMPBELL, M. E. N83-25345
CANNON, J. R. N83-24810
CARLIN, H. J. N83-24778
CARLSON, T. N. N83-24996
CARMICHAEL, I. S. E. N83-24984
CARNAHAN, C. L. N83-24944
N83-24985
CARR, R. W., JR. N83-24594
CARRERA, R. N83-25579
CARROLL, J. N83-25040
N83-25460
CARROLL, R. D. N83-25636
CARSON, C. C. N83-25146
CARTER, J. P. N83-24729
N83-24879
CASAZZA, S. N83-25113
CASKEY, B. C. N83-24866
CASPI, S. N83-25495
N83-25576
CASSISI, V. N83-24906
CASTLE, B. N83-24495
CASTLEMAN, A. W., JR. N83-24617
CERRINA, F. N83-25604
CERUZZI, A. N83-24582
CHALK, C. R. N83-24513
CHAMBERS, F. W. N83-25583
CHAMIS, C. C. N83-24559
CHAMPION, K. S. W. N83-25252
CHAMPION, R. N83-25193
CHAN, S. T. N83-25225
CHAN, T. N83-24936
N83-24956
CHANDLER, D. P. N83-24884
CHANDLER, R. F. N83-24489
CHANDRASEKARAN, N. N83-25593
CHANG, A. T. C. N83-25000
CHANG, K. K. N83-25063
CHAO, D. C. N83-24796
CHASTAGNER, P. N83-24692
CHATTERJEE, S. N83-24690
CHAZELLE, B. N83-25382
N83-25451
CHELEN, E. J. N83-25141
CHEN, C. M. N83-24616
CHEN, C. T. A. N83-25235
CHEN, F. F. N83-25565
CHEN, I. W. N83-24677
CHEN, J. N83-25074
CHEN, Z. N83-24583
CHERRY, S. N83-25272
N83-25275
CHEZEM, C. G. N83-25393
CHICHESTER, F. D. N83-24541
CHILDS, D. W. N83-24507
CHILDS, R. L. N83-24652
CHIMA, R. V. N83-24467
CHIN, B. H. Y. N83-25588
CHINNERY, M. A. N83-25254
CHISHOLM, M. H. N83-24581
CHOPRA, O. K. N83-24672
N83-24674
CHRUVU, S. M. N83-25601
CHU, F. N83-24846
CHUANG, T. J. N83-24915
CHUMLEA, W. C. N83-25355
CHUN, H. L. N83-24633
CIALONE, H. J. N83-25064
CICCHINELLI, L. F. N83-24523
CILIBERTI, D. F. N83-24598
CIMOLINO, M. N83-24583
CIRMAN, J. R. N83-25234
CIVINSKAS, K. C. N83-24505
CLAAR, T. D. N83-25082
CLAESSON, J. N83-24974
CLAPP, N. E., JR. N83-25618
CLARK, C. E. N83-25121
CLARK, G. A. N83-24762
CLARK, J. F. N83-25275
CLARK, J. H. E. N83-25270
N83-25282
CLARK, N. H. N83-25193
CLAYHOLD, J. A. N83-25376
CLAYPOOL, G. E. N83-24928
CLEMENTS, P. C. N83-25411
CLINCH, J. M. N83-25069
COCHRANE, R. L. N83-25070
COFFER, J. G. N83-24587
COHEN, J. N83-24567
COHEN, L. N83-24934
COLE, M. A. N83-25346
COLE, M. W. N83-25519
COLE, R. L. N83-25078
COLEMAN, S. D. N83-25169
COLEMAN, T. F. N83-25421
COLLINGS, E. W. N83-24765
COLLINS, C. L. N83-24852
COLLIS, W. J. N83-25586
COLVIN, C. M. N83-25532
N83-25536
COLVIN, J. D. N83-25635
COLWELL, J. E. N83-25024
COMMISSO, R. J. N83-24785
COMPTON, L. E. N83-25063
COMPTON, R. N. N83-25517
N83-25520
COMPTON, R. T., JR. N83-24743
COMSTOCK, R. N. N83-24592
CONLIN, J. A. N83-24650
CONNELLY, E. M. N83-25463
CONNORS, M. N83-25351
CONSTANTINE, G. M. N83-25492
CONSTANTINE, R. N83-25326
CONWAY, J. N83-24992
COOK, N. G. W. N83-24949
COOK, S. A. N83-25376
COONS, W. C. N83-25182
COOPER, T. G. N83-24752
CORBIERE, P. A. N83-25113
CORNELIUS, C. N83-24731
CORNELIUS, D. K. N83-24602
CORYNEN, G. C. N83-25428
COSTA, J. E. R. N83-25644
COTTINGHAM, J. G. N83-24790
COX, A. L. N83-25621
COX, D. D. N83-25452
COX, R. N83-25324
COY, J. J. N83-24858
COYLE, R. T. N83-25197
CRABTREE, M. S. N83-25375
CRANDALL, M. G. N83-25464
CRANE, R. F. N83-25271
CRANE, R. K. N83-25283
CRAWFORD, D. W. N83-25346
CROMBIE, M. A. N83-25007
N83-25008
CROSS, M. N83-25640
CURTIS, H. B. N83-25109

D

DABBS, J. R. N83-25646
DALCHER, A. W. N83-24913
DALE, R. F. N83-25270
N83-25279
DANIELSON, L. N83-25203
DAUPHIN, J. N83-24528
DAVID, S. A. N83-24660
DAVIDSON, D. L. N83-24647
DAVIDSON, K. L. N83-25246
DAVIES, B. S. N83-25594
DAVIES, P. B. N83-25506
DAVIS, A. N83-25179
DAVIS, J. W. N83-24670
DAVIS, L., JR. N83-25634
DAVIS, R. M. N83-24515
DEAL, R. M. N83-25077
DEARBORN, F. K. N83-25248
DEGAONKAR, S. S. N83-25644
DELACRUZ, A. N83-25332
DELANY, J. N83-24967
DELENE, J. G. N83-25021
DELLEVA, M. I. N83-25546
DELNORE, V. E. N83-25337
DEMENT, W. C. N83-25360
DEOLIVEIRA, M. D. L. N. N83-25004
DEOLIVEIRA, P. P. B. N83-25389
DERBY, R. J. N83-25228
DERUIJTER, W. P. M. N83-25321
DEUTSCH, M. N83-25150
DEVAN, J. H. N83-24671
N83-24673
DEVINCENZI, D. L. N83-24556
DEVINE, E. N83-24545
DEVRIES, W. R. N83-24857
DEWEY, B. R. N83-24912
DHARMADHIKARI, V. S. N83-25039
DIAMOND, R. N83-25371
DIAS, L. A. V. N83-25001
DIBENEDETTO, E. N83-24810
DIBIASI, L. N83-24892
DICKEY, H. C. N83-25191
DIEBOLD, J. N83-25144
DIESEN, B. C., III N83-25000
N83-25274
DIGGES, T. G., JR. N83-25032
DIGIACOMO, M. N83-24545
DILAURO, G. F. N83-25087
DILLAWAY, B. N83-24548
DINERSTEIN, H. L. N83-25629
DIRECTOR, B. A. N83-25511
DOBSON, J. E. N83-25021
DOE, T. N83-24941
N83-24954
DORMAN, C. E. N83-25291
DORN, H. C. N83-24624
DOSANJOS, C. E. N83-25002
DOSCHEK, G. A. N83-25647
DOSS, J. D. N83-25368
DOSSANTOS, C. D. N83-24770
DOSSANTOS, J. R. N83-25001
DOSTAL, M. N83-25123
DOUGHTY, C. N83-24973
N83-24974
N83-24976
DOVIAK, R. J. N83-25275
N83-25290
DOWNING, D. J. N83-25434
DOWNING, D. R. N83-24512
DOYLE, B. L. N83-24839
DOZIER, J. D. N83-24898
DRAKE, J. P. N83-25564
DRAKE, M. L. N83-24697
DRAPER, N. R. N83-25482
DREES, H. M. N83-25151
DREW, D. A. N83-24812
N83-24813
DRYER, F. L. N83-24588
DUBOIS, A. O. N83-24953
DUDLEY, I. T. N83-24650

DUDLEY, V. E. N83-25176
DUEVER, M. N83-25332
DULK, G. A. N83-25641
DUNN, J. R. N83-25213
DUNN, M. H. N83-24766
DUSEK, J. T. N83-25131
N83-25136
DYKSTRA, R. N83-25397

E

EARLE, M. D. N83-25341
EASTERLY, C. E. N83-25367
EASTMAN, L. F. N83-24778
EATHER, R. H. N83-25547
EATON, J. L. N83-24741
EBY, R. S. N83-24593
ECKERMAN, J. N83-25275
N83-25308
N83-25316
EDDE, H. N83-25081
EDDLEMAN, J. N83-25584
EDDLEMON, G. K. N83-25021
EDWARDS, D. J. N83-25076
EDWARDS, R. E., JR. N83-24606
EGGERS, A. J., JR. N83-25122
EIBLING, J. A. N83-25128
EINWOHNER, T. N83-25578
EISNER, S. B. N83-24928
EKLUND, T. I. N83-24805
EL-SAYED, M. A. N83-25597
N83-25598
ELBER, W. N83-24562
ELDREDGE, D. N83-24515
ELIAS, M. N83-25319
ELSNER, N. B. N83-24572
ELSPAS, B. N83-25402
ELWELL, D. N83-25035
EMARA-SHABAIK, H. E. N83-25459
EMERSON, E. L. N83-25626
EMERY, A. F. N83-24914
N83-24919
ENDERS, J. H. N83-25265
ENDO, H. N83-24941
ENDO, M. N83-25062
ENGELKING, P. C. N83-24590
ENNS, D. F. N83-24546
ENOMOTO, H. N83-24570
ERIKSSON, A. N83-25048
ERIKSSON, S. N83-24901
ERMAK, D. L. N83-25225
ERMI, A. M. N83-24651
ERNST, D. M. N83-24819
ESPARZA, E. D N83-24563
ESPOSITO, M. P. N83-25219
ETON, E. N83-24851
EURELL, J. A. C. N83-25356
EVANS, A. G. N83-24497
EVANS, G. A. N83-24582
N83-24582
EVANS, M. E. N83-24788
EVANS, R. J. N83-25231
EVERETT, K. R. N83-25011
EVERETT, S. S. N83-24758
EVERSOLE, W. L. N83-25412

F

FAETH, F. M. N83-24795
FAIRALL, C. W. N83-25246
FALCO, R. E. N83-24469
FALKNER, K. E. N83-24897
FARNSWORTH, R. K. N83-25270
N83-25280
FARRELL, C. E. N83-24544
FEHRENBACH, L. K. N83-25010
FEIGELSON, R. S. N83-25035
FEIGENBAUM, D. L. N83-25338
FEILER, P. H. N83-25398
FELDMAN, U. N83-25647
FELDSTEIN, C. N83-25346
FELSEN, L. B. N83-24761
FENG, W. W. N83-24568
FERNSLER, R. F. N83-24785
FERRANTE, J. N83-24636
FIELD, E. C., JR. N83-24747
FIGEN, J. N83-25394
FIKSEL, J. N83-25621
FINE, M. E. N83-24645
FINKE, R. C. N83-24552
N83-24764
FINKELMANN, H. N83-24613
FISCHER, D. M. N83-25595
FISCHLER, M. A. N83-25552
FISHER, A. L. N83-24780
FISHER, G. N83-24774
FISHMAN, G. S. N83-25478
N83-25479
N83-25480
FISK, W. J. N83-25234
FITZPATRICK, V. F. N83-25620
FIVELAND, W. A. N83-24602
FIX, G. J. N83-25431
FLAHERTY, J. E. N83-25432
FLAIM, T. N83-25150
FLAKE, D. N83-24774
FLECK, P. A. N83-25364
FLEISCHAUER, P. D. N83-25600
FLEMING, R. H. N63-24608
FLETCHER, J. W. N83-24735
FLEXSER, S. N83-24934
N83-24950
FLOWER, H. M. N83-24644
FLOWERS, E. C. N83-25102
FLUECK, J. A. N83-25271
N83-25284
FLYNN, E. T. N83-25362
FOLKENDT, M. N83-24595
FONG, K. W. N83-25619
FORBES, J. M. N83-25252
FORD, A. L. N83-25516
FORMAGGIO, A. R. N83-25001
FOROUHAR, K. N83-25484
FOSSUM, G. O. N83-25018
FOSTER, J. L. N83-25000
FOSTER, M. J. N83-24773
FOWLER, D. W. N83-24699
FOX, E. C. N83-25021
FOX, M. J. H. N83-24908
FRADKIN, L. N83-25216
FRAIOLI, A. V. N83-25131
N83-25136
FRAZIER, G. C. N83-24606
FREAS, R. C. N83-25020
FREISER, H. N83-24837
FREY, W. N83-24790
FRIBERG, S. E. N83-24721
FRIED, H. M. N83-25475
FRIEND, N. J. N83-25007
N83-25008
FRIPP, A. L. N83-24763
FROST, W. N83-25265
FUCHS, C. N83-25482
FUIJKSCHOT, P. H. N83-24519
FULMER, C. B. N83-25508
FUNDERLIC, R. E. N83-25491
FUNG, L. W. N83-25378
FUNG, Y. T. N83-24815
FUNKHOUSER, G. E. N83-25357

G

GABRIEL, T. A. N83-24652
GAFFNEY, P. W. N83-25472
GAHN, R. F. N83-25042
GALBRAITH, R. M. N83-24972
GALE, J. E. N83-24949
GARDNER, J. A. N83-24724
GARDOPEE, G. J. N83-25555
GARRISON, W. M., JR. N83-24666
GARTLING, D. K. N83-24820
GASKELL, P. S. N83-24740
GAUNAURD, G. N83-25502
GAY, B. M. N83-25070
GAYDOS, L. N83-25011
GEHRS, C. W. N83-25021
GELLES, D. S. N83-24662
N83-24663
GENOVESE, D. T. N83-24511
GEORGE, J. E. N83-25424
GERSON, D. J. N83-25010
GHATE, M. N83-25186
GHOSHROY, S. N83-24790
GHOSHTAGORE, R. N. N83-24775
GIESE, R. F. N83-25073
GIESSEN, B. C. N83-24700
GILBERT, W. N83-25495
N83-25576
GILL, A. N83-24640
GILL, P. E. N83-25442
GILLESPIE, L. K. N83-24620
GILMARTIN, T. J. N83-24626
GIRRENS, S. P. N83-24819
GIVEN, P. H. N83-25179
GLASS, H. L. N83-25596
GLASS, R. E. N83-25139
GLASSMAN, I. N83-24588
GLENN, M. F. N83-24496
GLOCK, M. D. N83-25370
GLOVSKY, R. P. N83-24863
GLUSTROM, L. N83-25236
GMUR, N. F. N83-25224
GOEL, A. L. N83-25414
GOETTELMAN, R. C. N83-25003
GOETZ, W. L. N83-24524
GOGLIA, G. L. N83-24543
N83-24558
GOLD, R. E. N83-24659
GOLDBERG, A. N83-24685
GOLDENBERG, D. N83-25071
GOLDENBLATT, M. K. N83-25049
GOLDHIRSH, J. N83-25275
N83-25311
GOLDMAN, Y. N83-24576
GOLDSTEIN, N. E. N83-24959
N83-24960
N83-24961
GOLDSTONE, L. A. N83-24554
N83-25119
N83-25120
N83-25175
N83-25177
N83-25205
N83-25206
N83-25207
N83-25208
N83-25214
GOMER, R. N83-24586
GOOCH, R. N83-24759
GOODS, S. H. N83-24919
GORDON, N. R. N83-24678
GOSMAN, A. D. N83-24868
GOSS, W. C. N83-25540
GOUBAU, W. M. N83-24962
GOYAL, K. P. N83-24971
N83-24980
GRAHAM, M. N83-25497
GRAHAM, R. W. N83-24506
GRAHAM, W. G. N83-25509
GRANFORS, P. R. N83-25607
GRANNEMAN, W. W. N83-25039
GRANT, J. P. N83-24626
GRANTHAM, W. L. N83-25337
GRASS, L. B. N83-25003
GRAY, W. H. N83-25387
GREAVES, J. R. N83-25274
GREEN, D. R. N83-24872
N83-25280
GREEN, L. A. N83-24601
GREENBAUER-SENG, L. A. N83-24575
GREENE, M. R. N83-25153
GREENE, N. M. N83-25470
GREENO, J. G. N83-25454
GREENSLADE, D. L. N83-24651
GREENWOOD, L. R. N83-24649
GREGG, D. N83-24595
GRIFFEN, C. W. N83-24694
GRIFFIN, D. M. N83-24831
GRIFFIN, F. J. N83-25101
GRIFFITH, C. G. N83-25273
N83-25288
N83-25296
GRIM, J. N. N83-24863
GROH, W. N83-25509
GRONSKY, R. N83-25606
GROSCH, C. E. N83-24797
GROSS, B. N83-24874
GROSS, E. C. N83-25508
GROSS, R. J. N83-25088
GROSSBECK, M. L. N83-24653
N83-24656
N83-24669
GROSSHANDLER, W. L. N83-24592
GROSSMAN, G. N83-24821
GRUBER, H. T. N83-24870
GRUBIN, H. I. N83-24756
GRUN, J. N83-24844
GRYNOVICKI, J. N83-25481
GUIRAO, C. M. N83-24722
GUSTAFSON, J. C. N83-24889
GUSTAFSON, T. K. N83-25026
GUVANASEN, V. N83-24943
GUZDAR, P. N. N83-25564

H

HADDAD, G. I. N83-24781
HAEUSSERMANN, C. N83-24555
HAFSKJOLD, B. N83-25084
HAGAMAN, J. A. N83-24561
HAGEDORN, N. H. N83-25042
HAGER, F. N83-24545
HAHN, M. T. N83-24910
HAI, O. Y. N83-25054

HAIGHT, R. C. N83-25512
HALDIPUR, G. B. N83-25141
HALFMAN, S. E. N83-24978
HALL, C. L. N83-25350
HALL, D. K. N83-25000
HALL, D. W. N83-24814
HALL, R. J. N83-24584
HALL, R. R. N83-24615
HALLEYY, A. N83-24516
HALLOCK, G. A. N83-25570
HALLQUIST, J. O. N83-24911
HAM, N. D. N83-25151
HAMILTON, H. H., II N83-24808
HAMILTON, M. L. N83-24658
HAMILTON, P. E. N83-25615
HAMLIN, G. N83-25424
HAMMER, J. H. N83-25584
HAMMOND, J. C. N83-24885
HAMMOND, J. P. N83-25140
HAMMOND, T. A. N83-24512
HAMROCK, B. J. N83-24855
N83-24875
HANAFEE, J. E. N83-24685
HANDLEY, J. N83-25081
HANES, L. F. N83-24737
HANOLD, R. J. N83-25262
HANSEN, D. F. N83-25327
HANSEN, I. G. N83-24552
HANSEN, J. D. N83-25060
HANSEN, L. N83-24972
HANSON, M. N83-25259
HARA, K. N83-24570
HARDWICK, D. A. N83-24703
HARDY, K. R. N83-25304
HARE, D. F. N83-25402
HARIHAN, S. I. N83-24766
HARMON, K. R. N83-24523
HARNED, D. S. N83-25567
HARRINGTON, T. P. N83-25376
HARRIS, K. L. N83-25018
N83-25023
HARRIS, P. N83-25549
HARRIS, R. E. N83-24784
HARRIS, T. B. N83-24814
HARRISON, E., JR. N83-24560
HARRISON, T. D. N83-25174
N83-25202
HARTMAN, C. W. N83-25584
HARTMAN, J. S. N83-25110
HASLETT, R. N83-25091
HASSENZAHL, W. N83-25495
N83-25576
HASSETT, D. J. N83-25018
HASTE, G. R. N83-25571
HASTINGS, D. A. N83-24999
HAUGHT, J. R. N83-24960
N83-24961
HAVENER, W. J. N83-25141
HAWS, L. D. N83-24686
HAWTHORNE, J. R. N83-24667
HAWTHORNE, W. R. N83-24859
HAYFORD, D. T. N83-24870
HAYNES, H. H. N83-24835
HEDAYA, A. S. N83-25492
HEDSTROM, J. C. N83-25129
HEFFLEY, R. K. N83-24468
HEFLINGER, D. G. N83-24582
HEIDKAMP, D. N83-24516
HEIKEN, G. N83-25155
HEILBERG, E. N83-24742
HEINEMANN, H. N83-24825
HELGERSON, R. N. N83-25021
HELLSTROM, G. N83-24974
HELVEY, R. A. N83-25322
N83-25323
HENDERSON, C. N83-25335
HENDREY, G. R. N83-25224
HENDRICKS, R. C. N83-24798
N83-24799
HENLEY, E. M. N83-25494
HENNIGAR, H. F. N83-25337
HENSLEY, D. C. N83-25508
HEPEL, M. N83-24580
HERBERT, R. F., JR. N83-25531
HERBST, M. J. N83-24844
HERMAN, H. N83-25610
HERMAN, R. G. N83-24630
HERMANN, B. R. N83-24497
HERMANSON, J. N83-25604
HERSH, H. N83-25072
HERTZBERG, A. N83-25092
HERTZBERG, R. W. N83-24910
HERZ, J. N83-25172
HESSEL, A. N83-24761
HEUZE, F. E. N83-25535
HEWETT, D. W. N83-25567
HEWITT, F. G. N83-25551
HEYMSFIELD, G. M. N83-25272
HIBBITT, H. D. N83-25418
HICKEY, B. M. N83-25230
HICKOX, C. E. N83-24824
HIEFTJE, G. J. N83-24585
HIGGINS, E. A. N83-25357
HIGHTOWER, D. N83-25350
HILBERT, R. P. N83-25354
HILDENBRAND, D. L. N83-25066
HILDERBRAND, R. L. N83-25354
HILL, J. M. N83-25204
HILL, M. L. N83-25326
HILL, R. W. N83-24605
HILLIS, D. L. N83-25571
HILLS, F. J. N83-24601
HILLS, R. S. N83-25256
HINICH, M. J. N83-25468
HINZ, K. N83-24931
HIRSCHFELD, T. N83-24614
N83-24992
HIRSCHON, A. S. N83-24597
N83-24622
HIRSTEIN, W. S. N83-25337
HOCHULI, U. N83-24845
HOCK, S. N83-25150
HOCKENSMITH, R. N83-24545
HOCKING, G. N83-25054
HODGDON, J. A. N83-25352
HODGE, R. C. N83-25560
HODGKINSON, J. N83-24488
HOEKSEMA, J. T. N83-25251
N83-25645
HOENLINGER, H. N83-24522
HOFFMAN, D. M. N83-24706
HOGAN, J. T. N83-25524
HOGAN, S. N83-25093
HOH, R. H. N83-24488
HOKMABADI, M. S. N83-25553
HOLANDA, R. N83-24829
HOLBROOK, J. H. N83-25064
HOLDEN, N. E. N83-25510
HOLLIG, K. N83-25444
N83-25445
HOLT, W. L. N83-24589
HOLWAY, H. P. N83-25217
HOLZHAUER, D. J. N83-25548
HONG, J. M. N83-24682
HOOD, M. N83-24953
N83-24990
HOPWOOD, J. E. N83-25385
HORN, F. L. N83-25229
HORNE, M. E. N83-25020
HORTON, J. R. N83-25140
HORWEDEL, B. M. N83-25386
HORWOOD, W. A. N83-24736
HOUCK, J. A. N83-24490
HOWARD, J. B. N83-24586
HOWARD, J. F. N83-25570
HOWARD, J. H. N83-24978
HOWELL, F. L. N83-25023
HSU, C. T. N83-25044
HSU, W. L. N83-25570
HU, W. L. N83-24663
N83-24668
HUANG, F. H. N83-24664
HUANG, Y. F. N83-24760
HUBA, J. D. N83-25564
HUBER, A. N83-24535
HUDLOW, M. D. N83-25280
HUDSON, H. S. N83-25646
HUFFMAN, F. N83-25203
HUM, G. P. N83-24608
HUMPHRESS, G. N83-25490
HUNKE, R. W. N83-25168
HUNT, L. P. N83-25033
HUNTER, H. E. N83-25331
HUNTER, K. N83-25135
HUSTON, E. L. N83-25065
HUTCHISON, K. N83-25257
HWANG, P. H. N83-25270
HYATT, B. Z. N83-24684
HYZAK, J. M. N83-24666

I

IDE, H. N83-25044
IGBENE, A. N83-24986
IKEUCHI, M. N83-24890
ILES, P. A. N83-25098
INGER, G. R. N83-24485
INOUE, M. N83-24903
IPPOLITO, L. J. N83-25292
ISAACS, H. S. N83-24679
N83-24688
N83-25061
ISAACS, L. T. N83-24804
ISHERWOOD, D. N83-25530
ISHIGAKI, T. N83-24890
ISOGAI, K. N83-24477
IYER, S. N83-25586

J

JACKSON, P. L. N83-25019
JACKSON, T. J. N83-24995
JACOBS, B. N83-24870
JACOBS, E. N83-25150
JACOBSON, B. O. N83-24875
JACQUET, P. N83-24501
JAHANBAKHSH, A. N83-24868
JALURIA, Y. N83-25196
JAMES, J. H. N83-25503
JAMES, J. W. N83-25148
JAVANDEL, I. N83-24952
JAYARAMAN, R. N83-24816
JEFFERIES, J. T. N83-25631
JEFFERSON, T. H. N83-25619
JELLISON, G. E., JR. N83-25558
JENKINS, R. G. N83-25179
JENSEN, G. A. N83-25620
JESSOP, E. S. N83-24709
JEVEC, J. M. N83-24616
JIANG, J. M. N83-25462
JOHNSON, A. B., JR. N83-25527
JOHNSON, D. W. N83-24486
JOHNSON, G. M. N83-24467
JOHNSON, L. C. N83-25360
JOHNSON, M. N83-24482
JOHNSON, P. J. N83-24724
JOHNSON, R. T. N83-24721
JOHNSON, W. N83-24472
JOHNSTON, J. G. N83-24893
JOHNSTON, W. W., JR. N83-24838
JOHNSTONE, A. D. N83-24535
JOLAS, A. N83-25562
JONCA, A. N83-25610
JONES, D. N83-25128
JONES, D. A. N83-24864
JONES, K. R. N83-25405
JOSHI, C. N83-25565
JOSHI, S. M. N83-24543
JOST, J. W. N83-24683
JOU, W. H. N83-24482
JOUBERT, J. I. N83-24720
JOYCE, G. N83-25563
JUAN, C. S. N83-25231

K

KAELBER, E. N83-24898
KAISER, T. B. N83-25581
KALTON, G. N83-25496
KAMIJO, K. N83-24861
KAMLJO, K. N83-24860
KANE, R. P. N83-25242
KANEHIRO, B. Y. N83-24943
KANG, G. S. N83-24758
KANNE, W. R., JR. N83-24865
KAPLAN, E. N83-25233
KAPLAN, P. D. N83-24746
KAPLAN, S. N. N83-25511
KARCHMER, A. M. N83-25499
KARL, R. N83-25232
KARLSSON, B. I. N83-25418
KARST, R. H. N83-25231
KASZETA, W. J. N83-25100
KATTER, L. B. N83-25080
KATZMAN, A. C. N83-25052
KATZMAN, M. T. N83-25052
KAUFMAN, A. N. N83-25572
KAUFMAN, L. N83-25032
KAUFMANN, P. N83-25642
N83-25644
N83-25649
KAUL, R. N83-25292
KAZEMIPOUR, A. K. N83-24802
KEAIRNS, D. L. N83-24598
N83-25141
KEDDY, E. S. N83-25147
KEE, R. J. N83-24557
KEENE, J. N83-25630
KEFFER, J. L. N83-24894
KEIL, F. N83-25370
KELLER, R. A. N83-24523
KELLEY, N. D. N83-25150
KELLY, E. J. N83-24745
KELLY, M. N83-24676
N83-25338
KELLY, M. L. N83-25062

KEMP, F. S. N83-24626
N83-24675
KENNEDY, F. E., JR. N83-24863
KERSHNER, D. D. N83-25539
KETELLE, R. H. N83-25021
KEYES, W. R. N83-24945
KEYSER, D. A. N83-25317
KHATTAK, C. P. N83-25027
N83-25030
N83-25031
N83-25032
N83-25033
KIDA, T. N83-24890
KIDDER, S. O. N83-25274
KIDDER, S. Q. N83-25303
KIKUCHI, M. N83-24861
KILLEEN, J. N83-25567
N83-25573
KING, L. D. N83-24491
KIRBY, P. B. N83-25611
KIRCHER, M. N83-24853
KIRK, B. L. N83-25264
KIRK, J. B. N83-24582
KISHI, T. N83-25429
KISHORE, N. N. N83-24568
KITIPORNCHAI, S. N83-24877
KJAER, K. N83-25605
KLAINER, S. M. N83-24991
N83-24992
KLEIN, R. H. N83-24468
KLIER, K. N83-24630
KLITGORD, K. D. N83-24923
N83-24931
KLUEH, R. L. N83-24656
KNAPP, J. A. N83-25604
KNAUSS, W. G. N83-24701
KNICKERBOCKER, J. U. N83-24707
KNIGHTLY, G. H. N83-24810
KNOLL, R. W. N83-24678
KNOROVSKY, G. A. N83-24917
KNOWLES, D. N83-25338
KNOWLES, G. N83-25040
KNOWLTON, M. N83-25370
KNYSTAUTAS, R. N83-24722
KO, K. C. N83-25085
KOBAYASHI, A. S. N83-24914
KOBAYASHI, Y. N83-24631
KOCH, E. F. N83-24886
KOCH, S. E. N83-25317
KOCIN, P. J. N83-25317
KOFSKEY, M. G. N83-24505
KOLIPARI, R. N83-25610
KOMINE, H. N83-24843
KONDO, H. N83-24475
KORBIN, G. N83-24936
KORETSKY, A. V. N83-24878
KOREVAAR, N. J. N83-24811
KORZENIOWSKI, E. S. N83-24899
KOSHINUMA, T. N83-24832
KOSKI, W. S. N83-24619
KOTHANDARAMAN, G. N83-24599
KOUSKY, V. E. N83-25319
KRAFFT, G. N83-25522
KRAMER, M. A. N83-24557
KRAMER, R. N83-24892
KRASIJ, M. N83-24675
KRAUZE, L. D. N83-24544
KRAWCZAK, J. A. N83-25551
KREJSA, E. A. N83-25499
KRESKOVSKY, J. P. N83-24756
KRIEGER, K. W. N83-25351
KRIPKE, D. F. N83-25364
KRISHNAMURTY, A. V. N83-24907
KRISHNAN, G. N. N83-25066
KRUER, W. L. N83-25580
KRUSE, R. L. N83-24473
KU, W. H. N83-24778
KUCERA, G. H. N83-25131
N83-25136
KUEPPER, T. A. N83-24579
KUMAR, B. N83-24697
KUMARESAN, R. N83-24750
KUNG, H. T. N83-24773
N83-24780
KURIYAGAWA, M. N83-25155
KUSHWAHA, H. S. N83-24826
KYRIAS, G. M. N83-24882

L

LABSON, V. N83-24960
LACKEY, D. N83-24488
LAGONIK, F. N83-24598
LAKIN, W. D. N83-24797
LAL, K. M. N83-24558
LALLY, J. P. N83-25467
LAMB, J. L. N83-24687
LAMPEL, M. N83-25526
LAN, C. E. N83-24796
LANDECKER, P. B. N83-25647
LANG, R. W. N83-24910
LANKFORD, J. N83-24647
LANUM, J. N83-25345
LAPEYRE, G. J. N83-25604
LARSON, V. H. N83-25043
LASINSKI, B. F. N83-24849
LAUB, R. J. N83-24611
N83-24612
N83-24613
LAUF, R. J. N83-24591
LAUGHLIN, C. R. N83-25271
N83-25285
LAWING, P. L. N83-24542
LAWSON, D. D. N83-25063
LAYTON, R. P. N83-25361
N83-25362
N83-25363
LEAVITT, L. D. N83-24478
LEAVITT, R. N83-24776
LECHTENBERG, T. A. N83-24670
LEE, E. P. N83-25583
LEE, H. L. N83-24564
LEE, J. H. N83-24722
LEE, K. H. N83-24956
LEE, P. N83-24849
LEES, E. M. N83-24650
LEFEVRE, P. J. N83-25403
LEHMBERG, R. H. N83-24844
LEISSA, A. W. N83-24909
LELAND, W. T. N83-24853
LEONARD, J. A. N83-25168
LERCH, H. E. N83-24928
LEVINS, W. P. N83-25165
LEVITT, K. N. N83-25402
LEWIS, B. E. N83-24823
LEWIS, D. H. N83-25221
LEWIS, E. N83-25490
LEWIS, E. L. N83-25531
LHERMITTE, R. M. N83-25272
N83-25275
N83-25309
LI, C. J. N83-24857
LICHTENBERG, A. J. N83-25570
LIEBERMAN, M. N83-25054
LIECHTI, K. M. N83-24701
LIGON, D. T. N83-24928
LILLEQUIST, G. C. N83-25567
LILLIE, R. A. N83-24652
LIMAYE, D. R. N83-25198
N83-25199
LIN, K. H. N83-24606
LIND, M. A. N83-25110
LINEBACK, N. G. N83-25012
LING, J. S. N83-25042
LIONS, P. I. N83-25464
LIOU, K. N. N83-25257
LIPPMANN, M. J. N83-24970
N83-24977
N83-24980
LIPPOLD, J. C. N83-24665
N83-24689
LITTLE, D. K. N83-24593
LITTLE, R. G. N83-25095
LIU, C. T. N83-24661
LIU, Y. K. N83-25351
LIVINGSTON, R. C. N83-25245
LLOYD, F. L. N83-24784
LOCKE, T. N. N83-25417
LOEWENTHAL, S. H. N83-24862
LOJEK, D. N83-24598
LONDEN, S. O. N83-25446
N83-25448
LONG, J. C. S. N83-24940
LONGSTREET, E. J. N83-24499
LOPES, R. V. D. F. N83-24530
LORELL, K. R. N83-24888
LOUCKS, O. L. N83-25332
LOVE, W. J. N83-24914
LOVEJOY, S. N83-25274
N83-25294
N83-25301
LOVELL, H. L. N83-25179
LOWDERMILK, W. H. N83-24850
LOWELL, C. E. N83-24639
LUCERO, B. N83-25326
LUCK, S. N83-24517
N83-24522
LUDEMA, K. C. N83-24857
LUKANDA, K. M. M. N83-25239
LYLE, F. F., JR. N83-24918
LYTLE, J. M. N83-24678
LYUBARSKY, Y. E. N83-25627

M

MACCRACKEN, C. D. N83-25075
MACCRONE, R. K. N83-25610
MACDONALD, M. N83-25071
MACKAY, R. A. N83-24578
MACKENZIE, E. N83-25245
MADARIAGA, H. A. N83-25068
MAHADEVAN, P. N83-24587
MAHLUM, D. D. N83-24621
MAHONEY, P. C. N83-25055
MAINQUY, A. M. N83-25243
MAINS, R. K. N83-24781
MAJER, E. L. N83-24963
N83-24979
MAKENAS, B. J. N83-24683
MANGOLD, D. C. N83-24937
N83-24938
MANLEY, J. R., JR. N83-25404
MANN, C. W. N83-25542
MANN, R. N83-25509
MANRO, M. E. N83-24479
MANSON, J. A. N83-24910
MANSURE, A. J. N83-25146
MANTAY, W. R. N83-24471
MANTIE, A. N83-24582
MARCHI, F. T. N83-24850
MARCUS, J. H. N83-25237
MARCUS, J. S. N83-25589
MARK, T. D. N83-24550
N83-24551
MARQUEZ, N. N83-24582
MARSHALL, S. B. N83-24564
MARTIN, D. W. N83-25273
N83-25293
MARTIN, J. F. N83-25164
MARTIN, J. W. N83-25186
MARTINEZ, H. E. N83-24822
N83-25147
MASAMITSU, J. A. N83-25583
MASCARENHAS, N. D. A. N83-25437
MASTANAIAH, K. N83-25126
MASTIN, C. W. N83-25430
MATHSEN, D. V. N83-25018
MATSEIKA, K. Y. N83-24792
N83-24793
MATSUMOTO, M. N83-24890
MATSUMURA, A. N83-25440
MATTICK, R. E. N83-24927
MAX, C. N83-24849
MAYBEE, J. D. N83-25103
MAYFIELD, M. E. N83-25064
MAYO, F. R. N83-24597
N83-24622
MAZIASZ, P. J. N83-24654
N83-24655
N83-24657
N83-24681
MCBREEN, J. N83-25061
MCCABE, M. M. N83-24615
MCCALDIN, J. O. N83-25599
MCCLANAHAN, E. D. N83-24678
MCCLINTOCK, F. A. N83-24677
MCCONKEY, E. D. N83-24491
MCCONNELL, D. G. N83-25270
MCCOY, G. A. N83-25148
MCCRAY, J. N83-25138
MCCULLOUGH, B. F. N83-24699
MCCUMBER, M. C. N83-25317
MCDONALD, G. N83-24799
MCDONALD, J. E. N83-24702
MCDONALD, T. J. N83-25358
MCELROY, A. D. N83-24618
MCEVILLY, T. V. N83-24963
MCEWEN, R. S. N83-24782
MCFADDEN, J. D. O. N83-25197
MCFARLAND, R. D. N83-25129
MCGRATH, D. N83-24615
MCGRATH, W. R. N83-24784
MCKENZIE, A. W. N83-25090
MCKENZIE, D. L. N83-25647
MCKENZIE, J. M. N83-25357
MCKINLEY, B. M. N83-24706
N83-24709
MCKINNEY, R. L. N83-25504
MCLALLIN, K. L. N83-24505
MCLARNON, F. N83-25132
MCLAUCHLAN, J. M. N83-25540
MCLAUGHLIN, A. J. N83-24779
MCMILLEN, D. F. N83-24606
MCNAMARA, B. N83-25395
MCPHERSON, M. J. N83-24957
N83-24990

MCTAGUE, J. P. N83-25605
MCTERNAN, D. N83-25010
MCTIERNAN, J. M. N83-25505
MCWHORTER, A. L. N83-24779
N83-25592
MEAD, W. C. N83-24849
MEDRANO-B, R. A. N83-25613
MEIER, A. K. N83-25188
MEIJER, W. N83-25332
MEISTER, R. P. N83-24870
MEITEN, J. G. N83-25271
MEITIN, J. G. N83-25288
MELLOR, F. K. N83-24932
MELVIN, W. R. N83-25381
MELVIN, W. W. N83-25265
MENDEL, J. E. N83-25528
MENEGHINI, R. N83-25275
N83-25308
N83-25316
MENZIES, R. T. N83-24842
MERCER, J. N83-24482
MERRIGAN, M. N83-24822
MERRITT, E. S. N83-25273
MERTENS, H. W. N83-25357
MERZBACHER, E. N83-25523
MESCALL, J. F. N83-24818
MESCHTER, P. J. N83-24646
MESHENBERG, M. J. N83-25046
MEULENBERG, A., JR. N83-25112
MEUSER, R. N83-25495
N83-25576
MEYER, A. H. N83-24699
MEYER, E. G. N83-25400
MIAO, D. N83-25625
MICHEL, M. C. N83-24945
N83-24972
MIKHAYLENKO, V. S. N83-25586
MILANOVICH, F. N83-24992
MILBURN, N. J. N83-25357
MILLARD, J. A. N83-25077
MILLARD, J. P. N83-25003
MILLER, A. H. N83-25049
MILLER, C. W. N83-24944
N83-24964
MILLER, E. R. N83-24539
MILLER, J. A. N83-24537
N83-24727
MILLER, P. L. N83-25467
MILLER, R. E. N83-24926
MILLER, W. A. N83-24827
MILLS, R. G. N83-25400
MINTZ, Y. N83-25270
N83-25276
N83-25277
MISHINA, M. N83-24738
MITCHELL, D. G. N83-24468
MITCHELL, R. N83-25150
MITCHELL, R. F. N83-25154
MITCHELL, T. E. N83-25612
MITTRA, R. N83-24757
MIYAKAWA, Y. N83-24861
MO, T. N83-24995
MO, X. N83-24984
MOCKLER, R. N83-25559
MODELL, H. I. N83-25365
MODINE, F. A. N83-25558
MOERNER, W. E. N83-24846
MOHAN, J. N83-25455
MOHR, J. G. N83-24749
MONDELLI, A. A. N83-25507
MONS, B. N83-25487
MONTOYA, P. C. N83-24824
MOORE, J. G. N83-25247
MOORE, J. H. N83-25423
MOORE, M. C. N83-25438
MOORE, R. K. N83-25275
N83-25312
MOORE, R. L. N83-24569
MOORE, S. W. N83-25129
MOORE, W. M. N83-24620
MORAN, C. N83-24710
MORE, J. J. N83-25421
MORET, L. K. N83-24984
MORGAN, C. S. N83-24591
MORGAN, J. R. N83-25597
N83-25598
MORI, M. N83-24860
MORI, S. N83-24618
MORIARTY, J. J. N83-25113
MORITZ, E. N83-25501
MORRIS, S. F. N83-25548
MORRISON, C. N83-24776
MORRISON, G. W. N83-25386
MORRISON, H. F. N83-24958
N83-24960
N83-24961
MOSES, R. W. N83-25567
MOSS, G. L. N83-24643
MOSS, R. N83-24545
MOTHA, R. P. N83-25279
MOZLEY, E. C. N83-24959
MUELLER, A. N83-25509
MULHOLLAND, P. J. N83-25332
MULLANEY, D. J. N83-25364
MULLEN, R. L. N83-24799
MURAKAMI, C. N83-24903
MURDOCH, J. B. N83-24991
MURPHY, B. D. N83-25260
MURPHY, H. D. N83-25155
MURPHY, M. J. N83-24867
MURRAY, A. L. N83-24814
MURRAY, J. G. N83-25585
MURRAY, J. J. N83-25342
MURRAY, W. N83-25442
MYER, L. N83-24951

N

NAGARAJA, R. S. N83-24510
NAINIGER, J. J. N83-25037
NAIR, P. K. N83-24873
NAKANISHI, K. K. N83-25425
NARASIMHAN, T. N. N83-24969
N83-24971
NASSOPOULOS, G. P. N83-25083
NATHANSON, F. E. N83-25314
NAUMANN, W. N83-25554
NAVANEETHAN, R. N83-25497
NDAY, I. N83-24993
NECHES, R. N83-25369
NEEDLEMAN, A. N83-25609
NEEPER, D. A. N83-25143
NEGRI, A. J. N83-25273
NEIL, J. M. N83-24983
NELSON, G. L. N83-25551
NELSON, J. I. N83-25353
NELSON, M. D. N83-25540
NELSON, P. H. N83-24953
N83-24955
NELSON, R. N83-25074
NELSON, V. N83-25212
NERI, L. M. N83-24489
NERO, A. V. N83-25234
NESS, W. G. N83-24515
NETHERWOOD, P. H., JR. N83-24643
NETO, A. F. N83-25614
NEUMANN, M. N83-25491
NEUSTADTER, H. N83-24516
NEVINS, W. M. N83-25581
NEWCOMB, W. A. N83-25581
NEWMAN, J. S. N83-25500
NEWMAN, R. C. N83-24679
N83-24680
N83-24688
NG, C. B. N83-24565
NGUYEN, N. Q. N83-24569
NICHOLS, L. B. N83-25151
NICOGOSSIAN, A. E. N83-25349
NIELSEN, M. N83-25605
NIEMIEC, G. N83-24774
NIR, A. N83-25264
NISHIDA, T. N83-25440
NISHIO, K. N83-24832
NITTA, N. N83-25644
NIXON, P. R. N83-25003
NJUS, G. N83-25351
NOHEL, J. A. N83-25444
N83-25448
NOLA, F. J. N83-24768
NOLL, R. B. N83-25151
NOORISHAD, J. N83-24942
NORDELL, B. N83-25048
NORMAN, J. H. N83-24723
N83-25062
NORTON, J. L. N83-24593
NOSAKA, M. N83-24861
NOUN, R. J. N83-25150
N83-25333
NOVAES, R. A. N83-24994
NOWLAN, M. J. N83-25053
NOWOTNY, H. N83-24691
NTONE, F. N83-24809
NUKHOPADHYAY, S. N83-25508
NUSSLE, R. C. N83-25625
NYSTUEN, J. A. N83-25272
N83-25302

O

OBERJOHN, W. J. N83-24602
OBERSTAR, J. D. N83-25590
OBRIEN, G. N83-25172
OFLAZER, K. N83-24773
N83-24777
OGIER, W. C. N83-24608
OHKAMI, Y. N83-24890
OHKI, N. N83-25644
OKAMOTO, O. N83-24903
OKEEFE, D. R. N83-25062
OKUDAIRA, N. N83-25364
OLSEN, W. N83-24487
OLSON, G. B. N83-24818
OLSON, R. N83-24516
OLSON, R. E. N83-25509
OLSZEWSKI, T. N83-24772
OMALLEY, R. E., JR. N83-25432
ONEAL, J. E. N83-24646
ONEIL, E. F. N83-24702
ONG, M. M. N83-25471
OPILA, R. N83-24586
ORAN, W. A. N83-24828
ORTON, G. F. N83-24550
N83-24551
OSBORN, F. W. N83-24902
OSTERYOUNG, R. A. N83-24580
OSULLIVAN, M. J. N83-24968
OSULLIVAN, W. N83-25559
OWEN, E. W. N83-24789
OWENS, T. C. N83-25018
OWINGS, D. K. N83-24928
OYE, H. A. N83-25084

P

PACE, C. E. N83-24732
PAGE, N. A. N83-25541
PAISLEY, M. J. N83-25070
PALAU, G. L. N83-25533
PALM, M. J. N83-24599
PALMOUR, H., III N83-25070
PANITZ, J. K. G. N83-24693
PANTAZIS, J. N83-24535
PAPACONSTANTOPOULOS, D. A. N83-25602
PAPADIMITRIOU, C. H. N83-25401
PAPPAS, G. N83-24492
PARADA, N. D. J. N83-24993
N83-24994
N83-25001
N83-25002
PARIKH, P. N83-24816
PARKER, J. F., JR. N83-25349
PARNAS, D. L. N83-25411
PARSIGNAULT, D. R. N83-24535
PASCAL H, F. A. N83-24609
PASMA, D. C. N83-24791
PATMORE, L. C. N83-24500
PATTON, J. L. N83-24593
PAUL, D. R. N83-24699
PAUL, W. N83-25611
PEARCE, B. E. N83-24531
PEARLSTEIN, L. D. N83-25581
PEARSON, K. O. N83-24728
N83-24734
PEEBLES, P. Z., JR. N83-24755
PEIPER, J. C. N83-24982
PELLEGRINI, C. N83-25521
PELROY, R. A. N83-24621
PENDLETON, R. N83-24492
PENNICK, H. G. N83-24873
PEPI, J. W. N83-25557
PEREIRA, J. A. G. N83-25437
PEREZ-MENDEZ, V. N83-25511
PEREZ-OTERO, N. O. N83-24524
PERKINS-SMITH, D. N83-25333
PERKINS, B. L. N83-25534
PERKINS, R. A. N83-25182
PERNISZ, U. C. N83-25111
PERROW, C. N83-25374
PERRY, D. L. N83-24948
N83-24989
PETERS, C. N83-25495
PETERS, J. E. N83-24873
PETERS, W. A. N83-24596
PETERSON, C. W. N83-24486
PETERSON, G. P. N83-24806
PETROSIAN, V. N83-25505
PETTERSON, M. B. N83-24698
PHILLION, D. W. N83-24849
PHILLIPS, S. L. N83-24986
PHILLIPS, T. G. N83-25630
PHILLIPS, T. N. N83-25433
PIAZZA, L. R. N83-25643
PICARD, R. N83-25483
PICKRELL, M. M. N83-25575
PIERCE, J. E. N83-25434

PIERCE, R. D. N83-25131
N83-25136
PIKE, D. H. N83-25386
PILLAY, K. K. S. N83-25533
PILLERS, C. N83-25397
N83-25477
PITZER, K. S. N83-24982
PLATZ, B. W., JR. N83-25342
PLEASANT, L. G. N83-24556
PLEMMONS, R. J. N83-25491
POAG, C. W. N83-24926
POEHLMAN, B. N83-25419
POKROWSKY, P. N83-24846
POLAND, R. E. N83-25352
POLHAMUS, G. D. N83-25366
POLINSKI, F. X. N83-25074
POLLACK, J. N83-25415
POLLARD, D. W. N83-24489
POOR, H. V. N83-25489
PORCAR, J. M. N83-25383
PORTER, R. N. N83-25211
PORTER, R. W. N83-25125
N83-25126
POWELL, A. C. N83-24483
PRACCHI, M. N83-25461
PRENGER, C. N83-24822
PRESLES, H. N. N83-25549
PRITCHARD, R. W. N83-24878
PRITCHETT, C. W. N83-25486
PROBER, E. N83-24784
PRUESS, K. N83-24968
N83-24969
N83-24970
PRUETT, B. N83-24849
PRUETT, H. D. N83-25426
PURNELL, A. W. N83-25108
PURSEL, F. P. N83-24836
PYATAK, A. I. N83-25566
PYLE, R. V. N83-25509

Q

QUAYLE, B. N83-25497

R

RABADI, N. N83-25372
RABITZ, H. N83-24557
RACHIELE, R. N83-24955
RADKE, C. J. N83-24947
N83-24987
RAGHURAMAN, P. N83-25055
RALPH, E. L. N83-25094
RAMAGE, C. S. N83-25273
RAMANUJIRAO, K. N83-25633
RAMER, R. J. N83-24610
RAMSEY, J. M. N83-24585
RAND, R. S. N83-25007
N83-25008
RANGO, A. N83-25000
RAO, B. C. S. N83-24856
RAO, K. R. N83-25632
RAO, P. V. N83-24634
N83-24637
N83-24641
N83-24695
RAPP, R. H. N83-25413
RARIDON, R. J. N83-25260
RASCHKE, E. N83-25287
RASMUSSON, E. M. N83-25270
N83-25278
RASOULI, F. N83-25372
RATAJCZAK, A. F. N83-25041
RATE, R. L., III N83-25332
RATTAN, K. S. N83-24783
RAUH, R. D. N83-25047
READING, J. F. N83-25516
RECHEN, J. N83-25576
REDDY, J. N. N83-24566
REED, R. P. N83-24787
REED, S. A. N83-24629
REID, L. N83-24470
REID, R. L. N83-25159
REIDY, W. P. N83-24481
REINISCH, B. W. N83-25247
REINKE, D. L. N83-25329
REINKE, R. G. N83-24716
REISFELD, S. K. N83-25143
REMBAUM, A. N83-25587
REMER, J. S. N83-24985
RENARDY, M. N83-25443
RENZ, D. D. N83-24552
REYNOLDS, G. H. N83-24572
REYNOLDS, W. C. N83-24816
RHOTEN, M. L. N83-24870
RICE, R. E. N83-25087
RICE, S. L. N83-24691
RICHARDS, P. L. N83-24784
RICHARDSON, D. L. N83-25621
RICHMOND, J. H. N83-24744
RICHTER, G. N. N83-24626
RICKELS, W. H. N83-25400
RICKLEY, E. J. N83-25500
RIPIN, B. H. N83-24844
RISING, K. H. N83-25620
RITSCHARD, R. N83-25233
RIVERS, M. L. N83-24984
ROACHE, P. J. N83-25457
ROBBINS, C. L. N83-25134
N83-25135
ROBERSON, C. W. N83-25507
ROBERTS, R. C. N83-25536
ROBERTS, W. L. N83-24612
ROBERTSON, J. B. N83-24763
ROBERTSON, T. N83-25397
N83-25477
ROBINSON, A. N83-25373
ROCHE, A. F. N83-25355
ROCHE, T. K. N83-24661
N83-24670
ROCHEFORT, J. S. N83-25404
RODEAN, H. C. N83-25225
RODER, H. M. N83-24800
RODGERS, E. B. N83-25274
N83-25305
ROGERS, P. S. Z. N83-24982
ROHANI, B. N83-24733
ROHATGI, N. T. N83-24598
ROHN, D. A. N83-24862
ROHY, D. A. N83-25068
ROMANKO, J. N83-24701
ROSE, M. E. N83-25431
ROSENBAUM, P. R. N83-25476
ROSENFELD, A. N83-25617
ROSENZWEIG, S. N83-25076
ROSEY, R. N83-25145
ROSS, D. S. N83-24608
ROSS, S. N83-24696
ROSSER, J. B. N83-25441
ROTHWELL, P. L. N83-24535
ROUFOSSE, M. C. N83-25238
ROURKE, M. D. N83-25550
ROWLAND, J. N83-25326
ROWLEY, J. C. N83-25155
ROZSNYAI, B. F. N83-25578
RUBIN, D. B. N83-25476
RUBIN, R. T. N83-25352
RUGGE, H. R. N83-25647
RUMMEL, R. N83-25469
RUNYAN, J. N83-24822
RUPRECHT, E. N83-25271
N83-25274
N83-25287
RUSSELL, B. D. N83-24786
RUSSELL, J. H. N83-25058
RUSSELL, M. C. N83-25055
RUSSO, J. N83-25537
RUTLEDGE, C. W. N83-24842
RUTTENBERG, S. N83-25339

S

SABBAH, D. N83-25388
SACHS, R. L. N83-25453
SAH, R. N83-25526
SAKIOTIS, N. G. N83-25099
SALAMA, K. N83-25593
SALMON, R. N83-24724
SALVADOR, L. A. N83-25141
SALZMAN, J. F. N83-25412
SAMET, H. N83-25617
SAMYAL, B. N83-25554
SANDERS, P. A. N83-25024
SANKARAN, K. K. N83-24646
SANTHANAM, P. N83-24784
SANTO, C. M. E. N83-25632
SANZ, J. M. N83-24474
SAROHIA, V. N83-24711
SAROLOUKI, M. N83-24711
SASTRY, S. M. L. N83-24646
SATCHLER, G. R. N83-25508
SATTERFIELD, C. N. N83-24625
SATTERWHITE, M. B. N83-25009
SAUNDERS, M. N83-25203
N83-25442
SAUTER, G. F. N83-25551
SAVAGE, R. C. N83-25274
N83-25306
SAVITS, T. H. N83-25466
SAWYER, D. E. N83-25097
SAYLER, I. O. N83-24694
SCAHILL, J. N83-25144
SCHACHER, G. E. N83-25246
SCHAFER, C. N83-24830
SCHAFFNER, S. K. N83-25337
SCHAFFT, H. A. N83-25093
SCHELLHOUS, R. R. N83-25359
SCHEMPP, E. N83-24991
SCHEPERS, H. J. N83-24480
SCHERRER, P. H. N83-25251
N83-25645
SCHERRER, V. E. N83-24785
SCHERTZER, S. P. N83-24599
SCHIFFMAN, Y. M. N83-25215
SCHIMANSKI, D. N83-24522
SCHISSEL, D. P. N83-25577
SCHLACHTER, A. S. N83-25509
SCHLEE, J. S. N83-24923
N83-24931
SCHLUDERBERG, D. C. N83-25086
SCHMEER, G. N83-24574
SCHMELLER, M. D. N83-24872
SCHMID, F. N83-25027
N83-25030
N83-25031
N83-25032
N83-25033
SCHMIDT, J. F. N83-24470
SCHMUGGE, T. J. N83-24995
N83-25307
SCHNACK, D. D. N83-25567
SCHNIPKE, R. J. N83-24602
SCHOENMAKERS, T. J. N83-24520
SCHOLLE, P. A. N83-24921
N83-24922
SCHREIBER, J. N83-25036
SCHUBERT, F. H. N83-25059
SCHUESSLER, H. N83-24573
SCHULTZ, R. M. N83-24593
SCHUON, S. R. N83-24638
SCHUTZ, J. B. N83-24705
SCHWARSER, R. R. N83-25227
SCHWARTZ, S. C. N83-24760
SCHWARZMEIER, J. L. N83-25567
SCOFIELD, R. A. N83-25273
N83-25295
SCOTT, R. G. N83-24685
SCRIBNER, L. L. N83-25060
SEAMAN, L. N83-24643
SEDLOCK, A. J. N83-24498
SEIDEL, W. F. N83-25360
SEKINE, H. N83-24476
SELF, H. C. N83-24503
SELIGA, T. A. N83-25272
N83-25289
SELISKAR, C. J. N83-24841
SELLGREN, K. N83-25628
N83-25629
SELTZER, S. M. N83-24547
SENTURIA, S. D. N83-24564
N83-24834
SEPPALA, L. G. N83-24850
SERAFIN, R. N83-25272
SETHURAMAN, S. N83-25335
SEVILLA, D. R. N83-24895
SGRO, A. G. N83-25567
SHACK, R. V. N83-25541
SHAFFER, C. N83-25617
SHAING, K. C. N83-25574
SHAM, T. L. N83-25609
SHAMPINE, L. F. N83-25474
SHANNON, R. R. N83-25541
SHARP, D. J. N83-24693
SHARP, R. D. N83-25013
SHEA, M. N83-24934
SHEAFFER, P. M. N83-24565
SHEARER, C. H. N83-24572
SHEN, D. W. N83-25555
SHENTON, L. R. N83-25473
SHEPHERD, C. N83-24481
SHEPPARD, D. N83-25326
SHEPPARD, N. F., JR. N83-24564
SHILOH, J. N83-25526
SHIMER, D. W. N83-24789
SHINGLEDECKER, C. A. N83-25375
SHIRLEY, J. A. N83-24584
SHOR, R. W. N83-25013
SHORE, R. A. N83-24748
SHORT, D. R. N83-25271
SHTARAS, S. S. N83-24792
N83-24793
SHUEN, J. S. N83-24795
SHUMAKER, R. C. N83-25258
SHYPRYKEVICH, P. N83-24876
SIBBETT, B. S. N83-25261

SIENKIEWICZ, M. E. N83-25266
N83-25267
SIERADZKI, K. N83-24679
N83-24680
N83-24688
SIERVOGEL, R. M. N83-25355
SILVA, R. J. N83-24946
SILVEIRA, K. P. N83-24886
SIM, J. W. N83-25131
N83-25136
SIMMONS, G. W. N83-24630
SIMMONS, H. M. N83-25557
SIMONEN, T. C. N83-25570
SIMONS, G. A. N83-24599
SIMPSON, C. A. N83-24601
SINES, G. N83-24567
SIVARAMAKRISHNAN, K. S. N83-24690
SKILLMAN, W. C. N83-25317
SKINNER, D. F., JR. N83-24604
SKLAR, H. N83-25150
SLABY, J. G. N83-25625
SMALLWOOD, D. O. N83-24916
SMELTZER, E. E. N83-24598
SMITH, A. D. N83-24784
SMITH, B. A. N83-25122
SMITH, B. C. N83-24684
SMITH, D. F. N83-25649
SMITH, D. I. N83-24672
SMITH, D. L. N83-24674
SMITH, E. A. N83-25300
SMITH, J. L. N83-24553
N83-25131
N83-25136
SMITH, M. A. N83-24928
SMITH, M. K. N83-24515
SMITH, M. L. N83-25427
SMITH, R. E. N83-24632
SMITH, R. J. N83-25604
SMITHRICK, J. J. N83-25038
SNYDER, D. L. N83-25402
SOLBAU, R. N83-24965
SOLECKI, R. N83-24691
SOLMAN, F. J. N83-25169
SOLOMON, A. D. N83-24801
N83-25079
N83-25435
SOLOMON, A. S. P. N83-24795
SOMERTON, W. H. N83-24981
N83-24987
SOMERVILLE, P. N. N83-25328
SORENSEN, E. P. N83-25418
SORENSEN, J. A. N83-24500
SPACKMAN, W. N83-25179
N83-25180
N83-25181
SPAITE, P. W. N83-25219
SPALVINS, T. N83-24635
SPANGLER, P. A. N83-24841
SPENCER, R. K. N83-24937
SPENCER, R. L. N83-25567
SPIEWAK, I. N83-25021
SPINWEBER, C. L. N83-25354
N83-25360
SPRINGFIELD, R. D. N83-24542
SQUIRES, T. G. N83-24623
SRAWLEY, J. E. N83-24874
ST.AUBIN, H. J. N83-24730
STAMPER, J. A. N83-24844
STANDLEY, W. R. N83-25067
STANT, R. S. N83-24840
STANZL, S. E. N83-24677
STAPH, H. E. N83-24725
N83-24726
STAPPAERTS, E. A. N83-24843
N83-24848
STARCHER, K. N83-25212
STARLING, K. E. N83-24603
STAUDT, J. J. N83-24725
N83-24726
STEARNS, J. W. N83-25509
STEBBINS, J. F. N83-24984
STEELE, R. S. N83-25160
STEFANAKOS, E. K. N83-25586
STEINBERG, M. N83-25229
STEPANOV, K. N. N83-25566
STEPHENS, D. R. N83-24605
STEPHENS, F. S. N83-25514
STERN, D. A. N83-24825
STERN, D. P. N83-25506
STERN, E. W. N83-24628
STEVENS, N. J. N83-24552
STEVENSON, S. N83-25497
STEWART, K. A. N83-25387
STEWART, T. S. N83-24582
STINE, R. D. N83-24851
STOCHL, R. J. N83-25037
STOCKTON, T. N83-24582
STODT, J. A. N83-25263
STOFFEL, T. L. N83-25178
STOFFER, J. O. N83-24721
STOKOWSKI, S. E. N83-24850
STOLZENBERG, J. N83-25236
STONE, E. C. N83-25634
STONE, J. P. N83-24730
STONER, G. E. N83-25060
STRAND, O. T. N83-25570
N83-25582
STRAUSS, H. R. N83-25581
STREET, T. T. N83-24730
STREETS, D. G. N83-25216
STRISOWER, B. N83-24936
STROMMEN, N. D. N83-25270
N83-25279
STROUD, R. W. N83-24749
STRUMPF, H. J. N83-25089
STUART, D. M., JR. N83-25485
STUART, M. J. N83-24561
STUEBING, E. W. N83-24578
STUFFLEBEAM, J. H. N83-24584
STUPP, B. N83-24698
STURROCK, P. A. N83-25649
SUCCI, G. P. N83-25498
SUCHOCKI, T. P. N83-25086
SUETSUGU, K. N83-24477
SUGAHARA, S. N83-25318
SUHR, N. H. N83-25179
SULIT, R. A. N83-24872
SUNDBERG, G. R. N83-24764
SUNYAEV, R. A. N83-25627
SURKO, S. W. N83-25114
SUYEHIRO, T. N83-25619
SUZIN, Y. N83-24696
SUZUKI, M. N83-24860
N83-24861
SVERJENSKY, D. N83-24972
SWAN, G. N83-25241
SWANNELL, P. N83-25436
SWENSON, B. C. N83-25420
SWITENDICK, A. C. N83-25602
SZABO, D. N83-25342
SZABO, M. F. N83-25219
SZEDON, J. R. N83-24775
N83-25191

T

TAHAMI, J. E. N83-25215
TAKAKURA, T. N83-25644
TAKEUCHI, D. N83-24487
TAKEUCHI, S. N83-24533
N83-24534
TANDBERG-HANSSEN, E. A. N83-25646
TANG, C. L. N83-24778
TANI, T. N83-24476
TARPLEY, W. B., JR. N83-24719
TATEM, B. C., JR. N83-24900
TAUSSIG, R. T. N83-25092
TAYLOR, C. N83-25495
N83-25576
TAYLOR, D. J. N83-24930
TAYLOR, F. V. N83-25412
TAYLOR, G. H. N83-24741
TAYLOR, L. T. N83-24624
TAYLOR, S. R. N83-25117
TEMOFONTE, T. A. N83-24775
TEMPLETON, T. N83-25610
TEMPS, F. N83-25506
TERNES, M. P. N83-25156
N83-25157
TESSENDORF, J. N83-25475
TETRAULT, W. A. N83-25363
THEISEN, P. N83-25138
THEISS, M. N83-24828
THEON, J. S. N83-25271
THIELE, O. W. N83-25269
N83-25270
THOMAS, D. B. N83-25107
THOMAS, G. H. N83-24919
THOMAS, J. N83-25481
THOMAS, J. B. N83-24760
THOMAS, L. E. N83-24662
THOMASON, M. D. N83-25515
THOMPSON, D. S. N83-24604
N83-24605
THOMPSON, J. A. N83-24713
THOMPSON, J. F. N83-25430
THOMPSON, R. L. N83-24840
THOMSON, F. J. N83-25024
THORHAUG, A. N83-25237
THORNTON, J. A. N83-24687
THORSNESS, C. B. N83-24605
THULSON, M. D. N83-24887
TIMNAT, Y. M. N83-24576
TINGEY, G. L. N83-24678
TIRSELL, G. N83-24849
TITTERINGTON, D. M. N83-25462
TOBAGI, F. A. N83-24754
TODD, M. N83-25244
TODD, M. J. N83-24883
TOFFER, H. N83-25376
TOMBAUGH, L. W. N83-25122
TOMLINSON, J. J. N83-25158
TONG, J. N83-24809
TORTORELLI, P. F. N83-24671
N83-24673
TOWNSEND, D. P. N83-24858
TOWNSEND, L. W. N83-25525
TOWSE, D. N83-25259
TRACHTENBERG, I. N83-25096
TRAUB, W. A. N83-25545
TRAYNOR, C. W. N83-25234
TRESTER, P. W. N83-25062
TREWELLA, J. C. N83-24601
TRINER, J. E. N83-24552
TRINH, T. N. N83-24757
TRIPP, N. K. N83-25304
TRUESDELL, A. H. N83-24970
TRUJILLO, V. A. N83-25384
TSANG, C. F. N83-24937
N83-24938
N83-24942
N83-24967
N83-24968
N83-24973
N83-24974
N83-24975
N83-24976
N83-24980
TSANG, K. T. N83-25569
TSANG, Y. W. N83-24939
TSITSIKLIS, J. N83-25401
TUCKER, C. E. N83-25217
TURIEL, I. N83-25234
TURNER, A. B. N83-24598
N83-25141
TURNER, R. E. N83-24849
TURNER, R. L. N83-25636
TUTTLE, J. L. N83-24549
TWESME, E. N. N83-24719

U

UENO, K. N83-25351
ULBRICH, C. W. N83-25310
ULLRICH, O. A. N83-24870
ULRICH, W. C. N83-24724
UNDERBAKKE, L. D. N83-24835
URSIN, R. N83-25354
UTHE, E. E. N83-25556

V

VACHON, W. A. N83-25152
VAINORIS, Z. A. N83-24792
N83-24793
VALENTINE, K. H. N83-25511
VALENTINE, P. C. N83-24925
VARAGONA, J. M. N83-24593
VASTOLA, F. J. N83-25179
VEDAM, K. N83-24775
VEIT, A. N83-24884
VENABLES, J. D. N83-24703
VENEZIANI, P. N83-25002
VENIER, C. G. N83-24623
VERONIS, G. N83-24932
VICKERS, R. R., JR. N83-25352
VINEY, C. E. N83-24824
VISHNIAC, H. S. N83-25343
VISWANADHAM, Y. N83-25005
VITEK, J. M. N83-24651
VITKOVITSKY, I. M. N83-24785
VOGEL, J. L. N83-25271
N83-25286
VOGT, R. E. N83-25634
VONCHAIN, H. J. P. N83-24510
VONDERHAAR, S. P. N83-24971
N83-24978
VONDERHAAR, T. H. N83-25300
N83-25329
VONK, S. J. N83-25182

W

WAGNER, H. G. N83-25506
WAGNER, L. A., JR. N83-24540

WAIBEL, R. T. N83-25082
WAKABAYASHI, Y. N83-24890
WAKATANI, M. N83-25581
WALKER, D. A. N83-25011
WALKER, J. C. N83-24904
WALKER, P. L. N83-25179
WALLERSTEIN, E. P. N83-24850
WALRAFEN, G. F. N83-25553
WALSH, E. J. N83-25311
WALSH, J. L. N83-24794
WALTER, C. H. N83-24744
WANG, A. S. D. N83-24568
WANG, J. H. N83-24602
WANG, J. S. Y. N83-24938
N83-24942
WANG, P. S. N83-24686
WANG, S. Y. N83-24937
WARBER, C. R. N83-24747
WARES, R. N. N83-24719
WARHOLA, G. T. N83-24577
WARNER, W. P. N83-25396
WARREN, R. N83-25576
WARTMAN, B. L. N83-25023
WASYNCZUK, O. N83-25190
WATANABE, A. N83-24514
WATANABE, I. N83-24767
WATANABLE, Y. N83-24860
WATERS, M. H. N83-24500
WATSON, G. S. N83-25465
WATSON, P. N83-24774
WEAVER, D. C. N83-25012
WEBBER, P. J. N83-25011
WEBBER, R. N83-25617
WEBER, D. D. N83-24550
N83-24551
WEBER, E. J. N83-25247
WEBER, M. J. N83-24854
WEERTMAN, J. R. N83-24645
WEGLEY, H. L. N83-25049
WEILMUENSTER, K. J. N83-24808
WEINER, M. M. N83-24746
WEINGARTEN, N. C. N83-24513
WEINMAN, J. A. N83-25299
WEINSTEIN, B. N83-24851
WEISS, D. M. N83-25411
WEISS, M. S. N83-25513
WELLS, C. H. N83-24873
WELLS, P. B. N83-25083
WEN, J. T. Y. N83-25488
WENKAM, C. R. N83-24921
N83-24922
WERES, O. N83-24972
N83-24988
WERNER, M. W. N83-25629
WEST, G. S. N83-24803
WEST, G. T. N83-24718
WETZEL, P. J. N83-25298
N83-25317
WHEELER, T. G. N83-25345
WHEELER, T. P. N83-25404
WHIGHAM, D. N83-25332
WHISTLER, W. T. N83-24850
WHITAKER, C. N83-25054
WHITAKER, R. D. N83-25108
WHITE, A. F. N83-24948
WHITE, D. H. N83-24554
N83-25119
N83-25120
N83-25175
N83-25177
N83-25205
N83-25206
N83-25207
N83-25208
N83-25214
WHITE, J. L. N83-24565
WHITE, M. A. N83-25357
WHITE, R. M. N83-25512
WHITELAW, J. H. N83-24868
WHITLOCK, R. R. N83-24844
WHITNEY, H. E. N83-25245
WHITON, R. C. N83-25325
WICHIENCHAROEN, C. N83-25006
WICKS, G. N83-24778
WICZER, J. N83-25194
WIDROW, B. N83-24759
WIETING, A. R. N83-24794
WIFFEN, F. W. N83-24670
WILCOX, J. M. N83-25251
N83-25645
WILDIN, M. W. N83-25163
WILHEIT, T. T. N83-25274
N83-25299
WILKINS, D. N83-25373
WILLIAMS, A. C. N83-25543
N83-25544
WILLIAMS, F. W. N83-24730
WILLIAMS, G. P. N83-25604
WILLIAMS, M. K. N83-25532
N83-25536
WILLIAMS, R. M. N83-25587
WILLIS, J. B. N83-24850
WILLMANN, P. A. N83-25395
WILSON, B. L. N83-25227
WILSON, B. W. N83-24621
WILSON, C. R. N83-24936
N83-24949
WILSON, D. G. N83-25435
WILSON, E. L. N83-24956
WILSON, J. W. N83-25525
WILT, M. N83-24960
N83-24961
N83-24967
N83-24979
WING, N. D. N83-24839
WIRSCHING, J. E. N83-25429
WISE, J. A. N83-24737
WITHERSPOON, P. A. N83-24939
N83-24942
N83-24949
N83-24952
WITTKE, J. N83-25638
WITTLIN, G. N83-24488
WOLF, C. J. N83-24814
WOLFF, P. A. N83-25493
WOLGA, G. J. N83-24778
WOLGAST, R. N83-25495
WOLLENBERG, H. N83-24934
N83-24936
N83-24950
WOLLMAN, S. N83-25581
WOO, J. C. H. N83-24499
WOOD, C. E. C. N83-24778
WOODEN, W. H., II N83-25250
WOODLEY, W. L. N83-25288
N83-25296
WOODS, D. D. N83-24737
WOODS, R. O. N83-25226
WOODWARD, D. W. N83-24778
WOOLCOCK, S. T. N83-24877
WORKHOVEN, R. M. N83-25176
WORLEY, E. H. N83-24547
WORLTON, J. N83-25616
WORLTON, W. J. N83-25380
WRENN, G. L. N83-24535
WRIGHT, F. T. N83-25477
WRIGHT, M. H. N83-25442
WRIGHT, R. L. N83-25086
WU, E. M. N83-24569
WUKELIC, G. E. N83-24998
WYLIE, D. P. N83-25273

Y

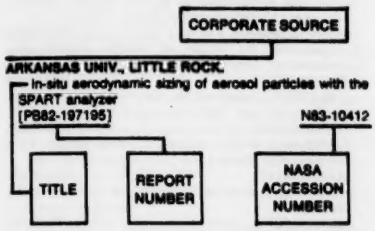
YABU-UCHI, K. N83-24903
YADIN, M. N83-25458
YAMAUCHI, G. K. N83-24472
YANG, C. C. N83-24913
YANG, C. Y. N83-25061
YANG, S. H. N83-24825
YANG, T. T. N83-24809
YANG, W. J. S. N83-24658
YATES, J. T. N83-25345
YATSUYANAGI, N. N83-24807
YAVROUIAN, A. H. N83-24711
YEAGER, W. T., JR. N83-24471
YEE, A. W. N83-24946
YEN, H. W. N83-25550
YORK, K. R. N83-25153
YORK, R. J. N83-24547
YOSHIMOTO, M. N83-25062
YOUNG, F. C. N83-24844
YOUNG, R. M. N83-25647
YOUNG, S. G. N83-24634
N83-24641
N83-24695
YU, C. N83-25538
YU, P. Y. N83-24852
YUEN, M. L. N83-24644

Z

ZACHARIAS, A. N83-24518
ZACKS, S. N83-25458
ZALUZEC, N. J. N83-24681
ZARETSKY, E. V. N83-24858
ZATKO, J. R. N83-24719
ZATORSKI, R. A. N83-25610
ZE, F. N83-24849
ZELLWEGER, A. G. N83-24493
ZELWER, R. N83-24977
N83-24979
ZERLAUT, G. A. N83-25103
N83-25105
N83-25108
ZEVELY, J. N83-24597
N83-24622
ZGHOUL, A. M. N83-24592
ZIEGLER, M. G. N83-25348
ZIEMER, W. P. N83-25449
ZINKLE, S. J. N83-25512
ZUK, D. M. N83-25546

CORPORATE SOURCE INDEX

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ACADEMY OF SCIENCES (USSR), MOSCOW.
Comptonization in radiation-dominated shocks and spectra of X-ray pulsars
[REPT-723] N83-25627

ADAPT SERVICE CORP., READING, MASS.
Machine classification of cloud particle types
[AD-A123402] N83-25331

ADMIRALTY MARINE TECHNOLOGY ESTABLISHMENT, TEDDINGTON (ENGLAND).
Acoustic intensity vectors inside infinite cylindrical elastic shell
[AD-A124259] N83-25503

AERONAUTICAL RESEARCH ASSOCIATES OF PRINCETON, INC., N. J.
Range safety signal attenuation by the Space Shuttle main engine exhaust plumes
[NASA-CR-170760] N83-24531

AEROSPACE CORP., EL SEGUNDO, CALIF.
Mesophase behavior in carbon fiber bundles
[AD-A123322] N83-24565
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence
[AD-A124300] N83-24582
Catalytic reduction of nitrogen dioxide
[AD-A123176] N83-24587
Chemical deposition of TiO2 layers on GaAs
[AD-A124281] N83-25600
Electron densities in a solar flare derived from X-ray spectra
[AD-A111360] N83-25647

AEROSPACE CORP., GERMANTOWN, MD.
Assessment of energy storage for solar applications N83-25076

AEROSPACE MEDICAL RESEARCH LABS., WRIGHT-PATTERSON AFB, OHIO.
Visual judgments of optical distortions in aircraft windscreens
[AD-A124307] N83-24503

AEROSPACE SYSTEMS, INC., BURLINGTON, MASS.
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151

AIR FORCE ENVIRONMENTAL TECHNICAL APPLICATIONS CENTER, SCOTT AFB, ILL.
Atmospheric transport and dispersion model: User's manual
[AD-A123352] N83-25324
Basic techniques in environmental simulation
[AD-A123342] N83-25325
Situation climatic briefs
[AD-A123369] N83-25330

AIR FORCE GEOPHYSICS LAB., HANSCOM AFB, MASS.
Structure and dynamics of the winter polar cap F region
[AD-A123706] N83-25247
Aerosol measurements with a high resolution spectrometer. Environmental research papers
[AD-A123691] N83-25248
Tides in the thermosphere: A review. Environmental research papers
[AD-A124314] N83-25252
Spectroscopic parameters for ozone from infrared and ultraviolet techniques
[AD-A124315] N83-25253

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Computer prediction of store aerodynamic loading during separation
[AD-A124693] N83-24483
Roughness effects on compressor outlet guide vanes at high Reynolds Number and high turning angle
[AD-A124688] N83-24511
An evaluation of the pavement condition index prediction model for rigid airfield pavements
[AD-A123002] N83-24524
A transportation model for a space colonization and manufacturing system: A Q-GERT simulation
[AD-A124685] N83-24540
A finite element computation of the electromagnetic fields within an engine inlet model
[AD-A124684] N83-24752
An assessment of the relationship between the coronary-prone (type A) behavior pattern, stress, and coronary heart disease
[AD-A122809] N83-25356
Air Force physical fitness: An assessment of characteristics and programs which affect individual physical fitness
[AD-A123022] N83-25359
Grid-based line drawing quantization
[AD-A124692] N83-25405
Effects of conduction band anisotropy on the exciton-plasma Mott transition in indirect gap semiconductors
[AD-A124687] N83-25594
Study of ohmic contacts on Si(28) - implanted GaAs
[AD-A124689] N83-25595

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Time-domain first born approximations to elastodynamic backscatter with applications to non-destructive evaluation of composites
[AD-A*23541] N83-24577
Optical properties related to electrical switching of Li doped NiO crystals
[AD-A124299] N83-25591

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Application of buffer thermal energy storage to an Air Brayton Solar Engine N83-25089

ALABAMA A & M UNIV., NORMAL.
Reduction of the one-dimensional X-ray scattering data on mirror flats at NASA/Marshall Space Flight Center
[NASA-CR-170749] N83-25543
Relations between mirror flats geometry and X-ray data
[NASA-CR-170750] N83-25544

ALABAMA UNIV., BIRMINGHAM.
The chemical basis for the origin of the genetic code and the process of protein synthesis
[NASA-CR-170334] N83-25344

ALABAMA UNIV., HUNTSVILLE.
Calibration of the active radiation detector for Spacelab-One
[NASA-CR-170752] N83-24833

ALABAMA UNIV., UNIVERSITY.
Land use/mineral rights map series
[DE83-901050] N83-25012

ALASKA UNIV., FAIRBANKS.
Auroral high latitude morphology and dynamics
[AD-A123381] N83-25249

AMES LAB., IOWA.
Development of an efficient coal-desulfurization process: Oxy-alkalinolysis
[DE82-016394] N83-24623

ANALYTIC DECISIONS, INC., HAWTHORNE, CALIF.
Infrared satellite technology study
[AD-A123831] N83-24536

ANALYTICAL MECHANICS ASSOCIATES, INC., MOUNTAIN VIEW, CALIF.
Computer programs for generation and evaluation of near-optimum vertical flight profiles
[NASA-CR-3686] N83-24500

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Remote sensing of battlefield weather conditions using unmanned air vehicles
[AD-A124275] N83-25326

APPLIED SOLAR ENERGY CORP., CITY OF INDUSTRY, CALIF.
Diffusion length measurement and silicon quality N83-25098

ARGONNE NATIONAL LAB., ILL.
Neutron source characterization for materials experiments N83-24649
Environmental effects on properties of structural alloys N83-24672
Compatibility studies of structural alloys with solid breeder N83-24674
Community energy management: An annotated bibliography
[ANL/CNSV-29] N83-25046
Metal-hydride heat-pump performance studies N83-25069
Field evaluation and assessment of thermal energy storage for residential space heating N83-25072
Assessment of cool storage in commercial building applications N83-25073
Development of natural stratification technology N83-25078
Advanced-fuel-cell development
[DE82-021146] N83-25131
Advanced-fuel-cell development
[DE82-021272] N83-25136
Identification of data gaps and research needs for solid wastes from synfuel technologies
[DE83-000936] N83-25216
Software for estimating sparse Jacobian matrices
[DE82-021234] N83-25421

ARIZONA SOLAR ENERGY COMMISSION, PHOENIX.
Geothermal development plan: Maricopa County
[DE83-004876] N83-25214

ARIZONA STATE UNIV., TEMPE.
Spectral estimation: An overdetermined rational model equation approach
[AD-A123676] N83-25456

ARIZONA UNIV., TUCSON.
Geothermal development plan: Northern Arizona counties
[DE83-004878] N83-24554
Miniaturized multisensor probes based on coated wire ion selective electrodes
[AD-A123415] N83-24837
Potential of utilization of geothermal energy in Arizona
[DE83-004875] N83-25119
Geothermal development plan: Pima County
[DE83-004877] N83-25120
Maryvale Terrace: Geothermal residential district space heating and cooling
[DE83-005286] N83-25175
Geothermal heating for the Arizona Environmental Research Laboratory greenhouses
[DE83-005287] N83-25177
Geothermal development plan: Pinal County
[DE83-004879] N83-25205
Geothermal development plan: Cochise/Santa Cruz Counties
[DE83-004880] N83-25206
Geothermal development plan: Graham/Greenlee Counties
[DE83-004881] N83-25207
Geothermal development plan: Yuma County
[DE83-004882] N83-25208

SOURCE

Geothermal development plan: Maricopa County [DE83-004876] N83-25214
ARKANSAS POWER AND LIGHT CO., LITTLE ROCK.
Central Arkansas Energy Project. Coal to medium-Btu gas [DE82-017577] N83-25184
Central Arkansas Energy Project: Coal to medium-Btu gas, volume 2 [DE82-016339] N83-25185
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, ABERDEEN PROVING GROUND, MD.
Transonic shock-turbulent boundary layer interactions on spinning axisymmetric bodies at zero angle of attack [AD-A123389] N83-24485
Nucleation threshold stresses for the dynamic fracture of a low-alloy Ni-Cr steel [AD-A123696] N83-24643
TNT equivalency of Pentolite hemispheres [AD-A123340] N83-24712
ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, DOVER, N. J.
Comparison of the optical reflectivity of a shock front in liquid water and in liquid nitromethane [AD-A123366] N83-25549
ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.
Feature component reduction through divergence analysis [AD-A123474] N83-25007
Scene classification results using the max-min texture measure [AD-A123496] N83-25008
Vegetation and terrain effects on digital classification of LANDSAT imagery [AD-A124236] N83-25009
Rapid Geodetic Survey System (RGSS) deflection of the vertical and gravity anomaly tests at White Sands Missile Range, 1980 [AD-A124197] N83-25244
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Annotated bibliography: Polymers in concrete [AD-A123414] N83-24702
Evaluation of three state-of-the-art water-jet systems for cutting/removing concrete [AD-A123579] N83-24732
An elastic-viscoplastic constitutive model for earth materials [AD-A123393] N83-24733
ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY, ROCK ISLAND, ILL.
CAM highlights, FY 82 [AD-A123395] N83-25417
ARMY MATERIALS AND MECHANICS RESEARCH CENTER, WATERTOWN, MASS.
Adiabatic deformation and strain localization [AD-A123695] N83-24818
Work-in-progress sessions of the Army Symposium on Solid Mechanics: Critical Mechanics Problems in Systems Design [AD-A119497] N83-24880

B

BABCOCK AND WILCOX CO., ALLIANCE, OHIO.
Computational tools for pulverized-coal combustion [DE82-021387] N83-24602
Electrochemical behavior of ferrous and ferric ions in EDTA/N2H4 solutions [DE83-900751] N83-24616
BABCOCK AND WILCOX CO., LYNCHBURG, VA.
Conceptual design of the moving bed thermal energy storage system for a commercial scale (100 MWe) solar central receiver power plant N83-25086
BALL AEROSPACE SYSTEMS DIV., BOULDER, COLO.
Hinge latch mechanism N83-24904
BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
A critique of the Bell Helicopter Textron COBRA 2.75 inch rocket ballistic algorithm [AD-A123703] N83-24502
Robust regression: A diagnostic tool [AD-A123651] N83-25481
BATTELLE COLUMBUS LABS., OHIO.
Design and fabrication of conventional and unconventional superconductors [NASA-CR-170753] N83-24765
Nondestructive testing of large steam-turbine rotors [DE83-901108] N83-24870
Hydrogen compatibility of steels N83-25064
BATTELLE HUMAN AFFAIRS RESEARCH CENTERS, SEATTLE, WASH.
US Department of Energy wind turbine candidate site program: The regulatory process [DE82-018444] N83-25153
BDM CORP., ALBUQUERQUE, N. MEX.
Geothermal completion technology life-cycle cost model (GEOCOM) [DE82-016787] N83-25146
BENDIX CORP., KANSAS CITY, MO.
Silicon carbide-reinforced plastic material [DE83-004944] N83-24570
An analysis of electrochemical deburring [DE82-020881] N83-24620
Applications of ion chromatography [DE83-004942] N83-24632
Preparation of diallyl phthalate prepolymer solutions [DE83-005330] N83-24708
Channel plating [DE82-021687] N83-24788
Bendix CAD-CAM site plan [DE83-005327] N83-25427
BENDIX CORP., TETERBORO, N. J.
Modular design attitude control system [NASA-CR-170736] N83-24541
BETTIS ATOMIC POWER LAB., PITTSBURGH, PA.
Radiation-induced dimensional changes of AM-350 stainless steel (LWBR development program) [DE82-021943] N83-24684
Chemical milling of zircaloy tubing to produce integral OD spiral finned tubes. AWBA development program [DE82-022078] N83-24736
BHABHA ATOMIC RESEARCH CENTRE, BOMBAY (INDIA).
Irradiation-induced embrittlement of steels used as reactor-pressure-vessel and end shields [DE82-904603] N83-24690
Coupled convective and conductive heat transfer by up-wind finite element method [DE82-904594] N83-24826
BOEING CO., SEATTLE, WASH.
Solar project description for Cathedral Square 10-story apartment building, Burlington, Vermont [DE82-010058] N83-25195
BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Aeroelastic loads prediction for an arrow wing. Task 3: Evaluation of the Boeing three-dimensional leading-edge vortex code [NASA-CR-3642] N83-24479
BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance report for Newman Power Station, El Paso, Texas, volume 14 [DE83-005377] N83-25130
Intermediate photovoltaic system application experiment operational performance report. Volume 6: For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma, October 1982 [DE83-005489] N83-25167
Intermediate photovoltaic system application experiment operational performance report. Volume 3. For Oklahoma Center for Science and Arts, Oklahoma City, Oklahoma [DE83-005379] N83-25173
Intermediate photovoltaic system application experiment operational performance report. Volume 4. For G. N. Wilcox Memorial Hospital, Kauai, Hawaii for June, July, and August 1982 [DE83-005380] N83-25174
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982 [DE83-005381] N83-25202
BOLT, BERANEK, AND NEWMAN, INC., CAMBRIDGE, MASS.
Limits on the prediction of helicopter rotor noise using thickness and loading sources: Validation of helicopter noise prediction techniques [NASA-CR-166097] N83-25498
BRISTOL UNIV. (ENGLAND).
The Bristol method of satellite-improved rainfall monitoring N83-25297
BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
Subjective evaluations of recent productions of television with stereophonic sound [BBC-RD-1983/3] N83-24740
Interference to television reception from large wind turbines [BBC-RD-1983/2] N83-24741
BROOKHAVEN NATIONAL LAB., UPTON, N. Y.
Ambient temperature stress-corrosion cracking of sensitized stainless steels [DE82-006846] N83-24679
Electrochemical aspects of stress-corrosion crack growth [DE82-021543] N83-24680
Electrochemical aspects of stress-corrosion cracking of sensitized stainless steels [DE82-020003] N83-24688
H5 fast-kicker-magnet pulser [DE82-020002] N83-24790
Research of advanced electrolytic hydrogen production N83-25061
Transport, fate and effects of energy-related pollutants: Evaluation of surface and groundwaters [DE83-005711] N83-25224
Possible storage sites for disposal and environmental control of atmospheric carbon dioxide [DE83-005993] N83-25229
Lessening the scope of federal coastal zone management: What's at stake [DE83-004048] N83-25233
MONEX79 atmospheric boundary-layer experiment over the Bay of Bengal: Digha data report [DE83-005456] N83-25335
Massive or weighty problem of atomic weight: It's a dimensionless dilemma [DE82-020741] N83-25510
Generators of coherent radiation from relativistic electrons [DE82-020370] N83-25521
Study of III-V semiconductor band structure by synchrotron photoemission [DE82-016331] N83-25604
BROWN UNIV., PROVIDENCE, R. I.
Green's functions at zero viscosity [DE83-004528] N83-25475
Effects of triaxial stressing on creep cavitation of grain boundaries [DE83-004083] N83-25609
BURROUGHS CORP., PAOLI, PA.
System description for automated radar terminal air traffic control system, ARTS 2 enhancements, revision A [FAA-PM-83-19-REV-A] N83-24494
BUTLER UNIV., INDIANAPOLIS, IND.
Recent changes in the global carbon balance of tropical organic soils [DE83-006814] N83-25382

C

CALIFORNIA INST. OF TECH., PASADENA.
Crystal growth in substrate-confined liquids [AD-A123386] N83-25599
Properties of young clusters near reflection nebulae [NASA-CR-170305] N83-25628
Research in particles and fields [NASA-CR-170335] N83-25634
CALIFORNIA UNIV., BERKELEY.
Microwave mixing and direct detection using SIS and SIS' quasiparticle tunnel junctions [AD-A123554] N83-24784
Coherent conversion of the sunlight spectrum [NASA-CR-170185] N83-25026
TMX tandem-mirror experiments and thermal-barrier theoretical studies [DE82-020352] N83-25570
CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Powder-metallurgy-processed A15 Nb3Al superconducting wires [DE82-022057] N83-24682
Heat- and mass-transfer effect in slurry-bed Fischer-Tropsch reactors [DE82-014980] N83-24825
Optical pumping of hot phonons in GaAs [DE82-020519] N83-24852
Nuclear waste isolation, geophysics and reservoir engineering, geosciences [DE83-004044] N83-24933
Geologic systems as analogs for long-term radioactive waste isolation: Intrusive-rock/country-rock contact zones N83-24934
Iron-nickel alloys as canister material for radioactive waste disposal in underground repositories N83-24935
Coupled hydrologic-thermomechanical experiments for radioactive waste isolation N83-24936
Thermal impact of waste emplacement and surface cooling associated with geologic disposal of nuclear waste N83-24937
Basis for a tentative thermohydrologic criterion for emplacement density in a nuclear waste repository N83-24938
Theoretical model of fluid flow through a deformable rock fracture N83-24939
Porous media equivalent for a network of discontinuous fractures N83-24940
Determining size and interconnection of fractures from constant-head well tests N83-24941

Development of a coupled thermal-hydraulic-mechanical finite-element model for saturated fractured porous media N83-24942
Assessment and evaluation of engineering options at a low-level radioactive waste storage site N83-24943
Verification and improvement of a predictive model for radionuclide migration N83-24944
Uranium disequilibrium measurements on groundwaters N83-24945
Uranium (VI) retardation mechanisms N83-24946
Sorptive diffusion in clay gels N83-24947
Investigation of silicate surface chemistry and reaction mechanisms associated with mass transport in geologic media N83-24948
Research on nuclear waste isolation at Stripa: An overview N83-24949
Radiogeologic assessment for nuclear waste isolation: Studies of the Stripa pluton N83-24950
Thermomechanical properties of Stripa granite N83-24951
Analysis of temperature data from the full-scale heater experiments at Stripa N83-24952
Rod-type extensometers in long-term elevated temperature service N83-24953
Determination of the state of stress at the Stripa Mine, Sweden N83-24954
Geophysical borehole measurements in low-permeability rock N83-24955
Development, verification, and application of modeling techniques for thermomechanical analysis N83-24956
Measurement of low rates of water inflow by monitored evaporation in the large-scale permeability experiment at Stripa N83-24957
Electromagnetic modeling using a fast numerical Sommerfeld integral N83-24958
An inferred conductivity distribution in the vicinity of Mount Hood, Oregon, based on the interpretation of magnetotelluric and telluric data N83-24959
In-field processing and magnetotellurics with the EM-60 electromagnetic system N83-24960
Deep electromagnetic sounding in the Basin and Range Province N83-24961
Simple one-dimensional inversions of magnetotelluric data N83-24962
The application of ASP: An automated seismic processor N83-24963
Advances in transient well-testing methodology N83-24964
Low- to moderate-temperature hydrothermal reservoir engineering research N83-24965
Evaluation of the hydrothermal potential of the Ashdod Area, Israel N83-24966
The Baca demonstration project N83-24967
Injection of cold water into geothermal reservoirs N83-24968
Modeling of fracture reservoirs N83-24969
Generic studies of geothermal reservoir behavior N83-24970
Subsidence modeling of the Pleasant Bayou geothermal geopressured region N83-24971
Fluid sampling and analysis of geopressured brine N83-24972
Simulation of thermal energy storage in a doublet well system N83-24973
A dimensionless parameter approach to the thermal behavior of an aquifer thermal energy storage system N83-24974
The characterization of heat storage in confined aquifers with buoyancy flow N83-24975
A comparative study of four major approaches to predicting ATES performance N83-24976
Overview of the Mexican-American cooperative program at the Cerro Prieto geothermal field N83-24977
Geologic model of the Cerro Prieto geothermal field N83-24978
Geophysical monitoring at the Cerro Prieto geothermal field N83-24979
Reservoir engineering studies of the Cerro Prieto geothermal field N83-24980
The behavior of rock-fluid systems at elevated temperatures and pressures N83-24981
Thermodynamics of high-temperature brines N83-24982
Preliminary determination of the Al(OH) sub 4 stability constants in the aqueous phase at elevated temperatures N83-24983
Thermodynamic properties of silicate materials N83-24984
Nonequilibrium, interphase mass transfer in chemical transport by groundwater N83-24985
Chemistry of nuclear waste substances in aqueous solutions N83-24986
Enhanced recovery of heavy oils with alkali N83-24987
The partitioning of hydrogen sulfide in the condensers of Geysers Unit 15 N83-24988
Geoanalytical and chemical bonding studies using modern surface techniques N83-24989
Mine ventilation planning: A case study N83-24990
The measurement of in situ stress using NQR/NMR N83-24991
Unique developments in Laser-Induced Fluorescence Fluorimetry (LIFF) N83-24992
Applied battery and electrochemical research program [DE82-020600] N83-25132
Low-to-moderate-temperature hydrothermal reservoir engineering handbook [DE82-016282] N83-25149
Supply curves of conserved energy [DE82-020066] N83-25188
Exclusion-list methodology for weatherization program in the Pacific Northwest [DE83-004051] N83-25234
Energy sources and climate [DE82-020612] N83-25334
File migration in distributed computer systems [DE82-021572] N83-25383
A summary of the RATFOR language, an extended portable dialect called REP, its style and flavor, and details of its implementation on the PDP-10 [LBL-13405] N83-25394
High-field superconducting accelerator magnets [DE82-020517] N83-25495
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer [DE82-020067] N83-25509
Digital neutron radiography using plane converters with multiwire proportional chambers [DE82-020294] N83-25511
Behavior of nuclei at high angular momentum [DE82-020267] N83-25514
Application of Robertson's collective focusing to final focusing [DE83-004050] N83-25522
Electron beam probe for charge neutralization studies of heavy ion beams [LBL-14391] N83-25526
Natural Poisson structures of nonlinear plasma dynamics [DE82-019299] N83-25572
Alternative dipole magnets for ISABELLE [DE82-020549] N83-25576
Crystalline to amorphous transformation in silicon [DE83-003713] N83-25601
Structure of Surfaces of Interfaces [DE82-019302] N83-25606

CALIFORNIA UNIV., LA JOLLA.
Sleep loss effects on continuous sustained performance [AD-A122392] N83-25364

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites [DE82-019108] N83-24568
Matrix-dominated time-dependent deformation and damage of graphite epoxy composite experimental data under ramp loading [DE83-005706] N83-24569
Uranium from seawater [DE83-000658] N83-24595
Method for initiating an undergound combustion process [DE82-020164] N83-24604
Technical underground-coal-gasification summation: 1982 status [DE82-020160] N83-24605
Microspectroscopy [DE82-020158] N83-24614
Mechanical properties evaluation of some commercial beryllium materials [DE82-020851] N83-24685
Crystallinity as a selection criterion for engineering properties of high-density polyethylene [DE82-020496] N83-24706
Evaluation of the use of HiSil 233 in silicone elastomers and cellular silicones [DE83-005029] N83-24709
Effects of unequal input-output sampling rates on the identification of electromagnetic-transient systems [DE82-021685] N83-24762
Normal zone detectors for a large number of inductively coupled coils [DE83-005416] N83-24789
ARGUS disk-target experiments at 1.06 micrometer, 0.53 micrometer and 0.35 micrometer [DE82-020169] N83-24849
Optical components for the Nova laser [DE82-017294] N83-24850
Oxide and halide laser glasses [DE82-020162] N83-24854

Improved design for dynamically-loaded, threaded interfaces [DE82-012701] N83-24867
NIKE2D: A vectorized, implicit, finite-deformation, finite-element code for analyzing the static and dynamic response of 2-D solids [DE83-008177] N83-24911
Energy and Technology Review [DE83-003802] N83-25115
Large-block experiments in underground coal gasification N83-25116
The Regional Seismic Test Network N83-25117
Understanding tandem mirror devices N83-25118
Numerical simulations of atmospheric releases of heavy gases over variable terrain [DE82-020351] N83-25225
Studies of earth stress and rock properties and the hydraulic-fracturing process [DE82-016779] N83-25259
GRAFL: A simplified graphics package [UCRL-53239] N83-25395
Data analysis using multiple filters [DE82-021948] N83-25425
A methodology for assessing the security risks associated with computer sites and networks. Part 1: Development of a formal questionnaire for collecting security information [UCRL-53292-PT-1] N83-25428
Minimization of path lengths in single stage connection networks [DE82-020174] N83-25429
Mathematical definition of protocol translation [DE82-015188] N83-25471
Digital ultrasonic signal processing techniques used for the clarification of ultrasonic signals [DE82-019244] N83-25504
A hybrid charged-particle guide for studying (n, charged particle) reactions [DE82-020864] N83-25512
Science and art in heavy-ion collisions [DE82-020497] N83-25513
Linear and non-linear calculations of the hose instability in the ion-focused regime [DE82-021549] N83-25518
Nuclear-waste disposal in geologic repositories [DE82-020176] N83-25530
Modeling of nuclear waste disposal by rock melting [DE82-012798] N83-25535
TMX tandem-mirror experiments and thermal-barrier theoretical studies [DE82-020352] N83-25570
Magnetic fusion energy and computers [DE82-020165] N83-25573
Theoretical analysis of spectral lines of one- and two-electron ions in hot plasmas [DE82-020163] N83-25578
Theory and simulation of laser plasma coupling, 2 [DE82-020350] N83-25580
Gyrokinetic equilibrium and stability in quadrupole tandem mirrors [DE82-020283] N83-25581
Study of impurities in the tandem mirror experiment using extreme-ultraviolet spectroscopy [DE82-020810] N83-25582
Mathematical models and illustrative results for the RINGBEARER 2 monopole/dipole beam-propagation code [DE82-021551] N83-25583
Studies of accelerated compact toruses [DE83-005488] N83-25584
SLATEC common mathematical library source file format [DE83-005812] N83-25619

CALIFORNIA UNIV., LOS ANGELES.
Advances in techniques for tracking and terminal state estimation of a goal seeking vehicle (The Target RV) via an optimal BMD intercept vehicle filter [AD-A124628] N83-24548
Stresses during fabrication of cylindrically woven carbon-carbon composites [AD-A123153] N83-24567
Filtering of systems with nonlinearities [AD-A124635] N83-25459
Singular differential game numerical technique and closed loop guidance and control strategies [AD-A124625] N83-25484
Stochastic differential games with complexity constrained strategies [AD-A124627] N83-25485
Stochastic differential game techniques [AD-A124634] N83-25487
Study of short-wavelength turbulence in dense plasmas [DE83-004488] N83-25565

Persistent currents in a rotating superleak partially filled with superfluid helium
[AD-A123522] N83-25589
Low temperature energy trapping and emission line profile of disordered solids
[AD-A123434] N83-25597
Energy transfer mechanism switching in disordered solids
[AD-A123448] N83-25598

CALIFORNIA UNIV., SAN DIEGO.
Research efforts
[NASA-CR-171654] N83-25348

CALMAC MFG. CO., ENGLEWOOD, N. J.
Effect of additives on performance of hydrated salt TES systems N83-25075

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Application of Calspan pitch rate control system to the Space Shuttle for approach and landing
[NASA-CR-170402] N83-24513

CAMBRIDGE UNIV. (ENGLAND).
The actuator duct representation of turbomachinery blade rows
[CUED/A-TURBO/TR-119] N83-24859

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).
Studies of substituent and solvent effects on solvolysis reactions. 1: The effect of polar alpha-substituents on the rate of alkaline ester hydrolysis in water at different temperatures
[NRC/CNR-TT-2059] N83-24574

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
MISE: Machine for In-System Evaluation of custom VLSI chips
[AD-A123334] N83-24773
Design and implementation of a single-chip 1-D median filter
[AD-A123328] N83-24777
Synchronizing large systolic arrays
[AD-A123374] N83-24780
Computational geometry on a systolic chip
[AD-A123362] N83-25382
A language-oriented interactive programming environment based on compilation technology
[AD-A123947] N83-25396
A comparative study of finite element and finite difference methods for Cauchy-Riemann type equations
[NASA-CR-166113] N83-25431
How to divide a polygon fairly
[AD-A123935] N83-25451
A study in parallel computation: The traveling salesman problem
[AD-A123327] N83-25455

CASE WESTERN RESERVE UNIV., CLEVELAND, OHIO.
Experiments in high-voltage electron microscopy
[DE83-005283] N83-25612

CATALYTIC, INC., WILSONVILLE, ALA.
Operation of the Wilsonville Advanced Coal-Liquefaction R and D Facility, Wilsonville, Alabama
[DE83-000110] N83-25133

CENTER FOR POLICY RESEARCH, INC., NEW YORK.
Organizational context of human factors
[AD-A123435] N83-25374

CENTRAL ELECTRICITY GENERATING BOARD, LONDON (ENGLAND).
Structural vibration damper for corrosive or high-temperature gaseous environments
[CEGB-TDB-379] N83-24906

CHEVRON RESEARCH CO., RICHMOND, CALIF.
Some error sources in electrical test elements for thin-film solar cells N83-25097

CHICAGO UNIV., ILL.
Photoemission of Xe and Kr adsorbed on the W(110) plane
[AD-A123580] N83-24586
Mineralogy and chemistry of planets and meteorites
[NASA-CR-170345] N83-25637

CHRYSLER CORP., NEW ORLEANS, LA.
Pressure scaled water impact test of a 12.5 inch diameter model of the Space Shuttle solid rocket booster
[NASA-CR-170761] N83-24538

CIVIL AEROMEDICAL INST., OKLAHOMA CITY, OKLA.
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete)
[FAA-CT-82-118] N83-24489

CLEMSON UNIV., S.C.
Experimental investigation of high performance, short, thrust augmenting ejectors
[AD-A125529] N83-24809
Potential of dual-measurement techniques for accurate determination of instantaneous rainfall rate from space N83-25310

CLEVELAND STATE UNIV., OHIO.
A study of dynamic energy equations for Stirling cycle analysis
[NASA-CR-168152] N83-25043

COAST GUARD, WASHINGTON, D.C.
HHE/LORAN-C surveying
[AD-A124343] N83-24498
Oceanographic observations North Pacific Ocean Station November and Pacific Standard Monitoring Sections P3, P4, P5, and P6, July 1966 - June 1974
[AD-A122224] N83-25342

COLLEGE OF WILLIAM AND MARY, WILLIAMSBURG, VA.
Research on turbulence in plasma
[NASA-CR-170260] N83-25561

COLOGNE UNIV. (WEST GERMANY).
Microwave radiometry sampling problems demonstrated with Nimbus 5 rain rates versus GATE data N83-25287

COLORADO STATE UNIV., FORT COLLINS.
Combined spaceborne and conventional measurements for precipitation estimation N83-25300
Weather forecast adjustment using model output cloud fields and digital satellite data
[AD-A123702] N83-25329

COLORADO UNIV., BOULDER.
Analytical prediction of turbulent heat transfer parameters
[AD-A123321] N83-24817
LANDSAT-assisted environmental mapping in the Arctic National Wildlife Refuge, Alaska
[AD-A123440] N83-25011
Critical scattering of laser light by fluid films and interfaces
[DE82-020046] N83-25559
Turbulence and wave particle interactions in solar-terrestrial plasmas
[NASA-CR-170339] N83-25641

COLUMBIA RESEARCH CORP., GAITHERSBURG, MD.
Automation of pre-cap visual inspection for integrated circuits
[AD-A123343] N83-24774

COMBUSTION ENGINEERING, INC., WINDSOR, CONN.
Conceptual design of a latent heat thermal energy storage subsystem for a saturated steam solar receiver and load N83-25087

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION (U. S. SENATE).
National Aeronautics and Space Administration Authorization Act, 1983 N83-25622
National Aeronautics and Space Administration Authorization Act, 1983 N83-25623

COMMUNICATIONS SATELLITE CORP., CLARKSBURG, MD.
Developments toward an 18% efficient silicon solar cell
[NASA-CR-168141] N83-25112

COMPUTER SCIENCES CORP., HUNTSVILLE, ALA.
Vector wind profile gust model
[NASA-CR-170762] N83-25320

CONNECTICUT UNIV., STORRS.
Investigation of role of subsurface zones in wear of materials
[DE83-900849] N83-24691

CONTEL INFORMATION SYSTEMS, FAIRFAX, VA.
Computer B (National Airspace System - Automated Radar Terminal Systems) communications support
[FAA-PM-83-16] N83-24742

CONTRAVES CORP., ZURICH (SWITZERLAND).
Space telescope: Solar array primary deployment mechanism N83-24884

CONTROL DATA CORP., SHREWSBURY, N.J.
Large scale software system design of the missile minder AN/TSQ-73 using the Ada programming language
[AD-A123308] N83-25410

CONTROL DYNAMICS CO., HUNTSVILLE, ALA.
ACOSS fifteen (Active Control of Space Structures)
[AD-A123530] N83-24547

CORNELL UNIV., ITHACA, N. Y.
Microwave semiconductor research: Materials, devices, circuits. GaAs ballistic electron transistors using buried metal gates
[AD-A123299] N83-24778
The perception of objects and their functional uses
[AD-A122797] N83-25370
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567

CRYSTAL SYSTEMS, INC., SALEM, MASS.
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027
Part 1: Silicon ingot casting. Heat Exchanger Method (HEM) N83-25028
Part 2: Multi-wire slicing. Fixed Abrasive Slicing Technique (FAST) N83-25029
Silicon slicing by fixed abrasive slicing technique N83-25030
Silicon crystal growth in vacuum N83-25031
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Single crystal growth of upgraded metallurgical silicon by HEM for photovoltaic applications N83-25033

D

DARTMOUTH COLL., HANOVER, N.H.
Factors influencing thermomechanical failure of face seals, 2
[AD-A124189] N83-24863
Sampling problems: The small scale structure of precipitation N83-25283

DAYTON UNIV., OHIO.
Proceedings: Ejector Workshop for Aerospace Applications
[AD-A124264] N83-24510
Intumescent coating development
[NASA-CR-170737] N83-24694
Vitreous enamel damping material development
[AD-A124290] N83-24697

DECISION FOCUS, INC., LOS ALTOS, CALIF.
Compressed-air energy storage: Commercialization potential and EPRI roles in the commercialization process
[DE83-900987] N83-25121

DEFENSE MAPPING AGENCY HYDROGRAPHIC AND TOPOGRAPHIC CENTER, WASHINGTON, D.C.
Automation of the DMA list of lights and radio navigational aids
[AD-A124199] N83-24496
Temporal image normalization
[AD-A123313] N83-25010
Polar motion prediction analysis
[AD-A124198] N83-25250

DEFENSE SYSTEMS MANAGEMENT SCHOOL, FORT BELVOIR, VA.
Multi-dimensional program management
[AD-A123635] N83-25615

DENVER RESEARCH INST., COLO.
Relative cost and training effectiveness of the 6883 F-111 converter/flight control system simulators as compared to actual equipment
[AD-A123534] N83-24523

DEPARTMENT OF DEFENSE, WASHINGTON, D. C.
Report of the Department of Defense Joint Service Task Force on software problems
[AD-A123449] N83-25416

DEPARTMENT OF ENERGY, BARTLESVILLE, OKLA.
Liquid fossil-fuel technology
[DE82-020005] N83-25183

DEPARTMENT OF ENERGY, MORGANTOWN, W. VA.
Coal-Gasification Modeling Workshop Proceedings
[DE82-017279] N83-25186

DEPARTMENT OF ENERGY, PITTSBURGH, PA.
Transport characteristics of alternate supply fuels
[DE82-020246] N83-24720

DEPARTMENT OF ENERGY, WASHINGTON, D. C.
Report to the Congress: Strategic Alcohol Fuel Reserve
[DE83-005454] N83-24717
An assessment of the basic energy science program. Volume 1: Technical Report
[DOE/ER-0123] N83-25056
Report to the Congress: Regional petroleum reserves
[DE83-005270] N83-25124
Advanced energy projects: FY 1982 research summaries
[DE83-003140] N83-25210
The long range transport of air pollution
[DOE/EP-0037] N83-25221

DIGITAL PROGRAMMING SERVICES, INC., WALTHAM, MASS.
Derivation and implementation of exponential functions to model axial scattering spectrometer data distributions
[AD-A123388] N83-25467

DRAVO LIME CO., PITTSBURGH, PA.
Distribution and analysis of high-purity magnesian limestones in the United States
[DE83-901141] N83-25020

DREXEL UNIV., PHILADELPHIA, PA.
On mixed-mode fracture in off-axis unidirectional graphite-epoxy composites
[DE82-019108] N83-24568
Infrared emission from gas-aerosol reactions
[AD-A123365] N83-24578

DSET LABS., INC., PHOENIX, ARIZ.
Spectroradiometer measurements in support of photovoltaic device testing N83-25103

The calibration of pyrheliometers and pyranometers for testing photovoltaic devices N83-25105
Progress in the development of standad procedures for the global method of calibration of photovoltaic reference cells N83-25106

DU PONT DE NEMOURS (E. I.) AND CO., AIKEN, S.C.
Isotope-dilution analyses of the metallic elements [DE83-004924] N83-24692
Welding iridium heat-source capsules for space missions [DE82-020098] N83-24865

DYNETICS, INC., HUNTSVILLE, ALA.
Ascent trajectory dispersion analysis [NASA-CR-170741] N83-24529

E

EAGLE-PICHER INDUSTRIES, INC., JOPLIN, MO.
Research, development, and demonstration of nickel-iron batteries for electric-vehicle propulsion [DE82-021266] N83-25137

EATON CORP., SOUTHFIELD, MICH.
Electric-hybrid-vehicle simulation [DE82-020838] N83-24791

ECODYNAMICS RESEARCH ASSOCIATES, INC., ALBUQUERQUE, N. MEX.
Adaptive grid generation using elliptic generating equations with precise coordinate controls [AD-A123181] N83-25457

EDDE (HOWARD), INC., BELLEVUE, WASH.
TES technology transfer in the pulp and paper industry N83-25081

EDGERTON, GERMESHAUSEN AND GRIER, INC., ALBUQUERQUE, N. MEX.
Performance testing of the Solar Kinetics T-700A solar collector [DE83-005382] N83-25176

EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Dickinson geothermal study [DE82-016945] N83-25018
Low-to-moderate-temperature hydrothermal reservoir engineering handbook [DE82-016282] N83-25149

EDGERTON, GERMESHAUSEN AND GRIER, INC., LOS ALAMOS, N. MEX.
Evolutionary models for SNI progenitor stars [DE82-019939] N83-25635

EFFECTS TECHNOLOGY, INC., SANTA BARBARA, CALIF.
Instrumentation and data acquisition for satellite testing in nuclear environments [AD-A123560] N83-25554

EIC, INC., NEWTON, MASS.
Development of photoelectrochemical cells based on compound semiconductors and nonaqueous electrolytes [DE82-012700] N83-25047

EMMANUEL COLL., BOSTON, MASS.
The plasma experiment on board meteosat-F2 [AD-A123377] N83-24535
Phase and amplitude scintillation statistics at 244 MHz from Goose Bay using a geostationary satellite [AD-A124291] N83-25245

ENERGY AND MINERALS RESEARCH CO., EXTON, PA.
Coal/oil thixogel fuels for diesels [DE83-000398] N83-24719

ENERGY SYSTEMS GROUP, INC., ATLANTA, GA.
SLR-PLUS version 1.0 user's manual [DE83-004109] N83-25204

ENERTECH ENGINEERING AND RESEARCH CO., HOUSTON, TEX.
Advanced wellbore thermal simulator GEOTEMP2 research report [DE82-020050] N83-25154

ENGELHARD INDUSTRIES, INC., EDISON, N.J.
Bench-scale development of catalysts for reforming aromatic and heterocyclic hydrocarbons [DE82-015422] N83-24628

ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
Detection of rainfall rates utilizing spaceborne microwave radiometers N83-25304

ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Development and testing of LANDSAT-assisted procedures for cost-effective forest management [E83-10289] N83-25024
Three-dimensional vision system for the adaptive suspension vehicle [AD-A124277] N83-25546

EPPLEY LAB., INC., NEWPORT, R.I.
Solar radiometers N83-25101

EUROPEAN SPACE AGENCY, NOORDWIKJ (NETHERLANDS).
Considerations on the lubrication of spacecraft mechanisms N83-24583

EUROPEAN SPACE AGENCY, PARIS (FRANCE).
Development of the flow field in streamwise corners at hypersonic speeds and effects of the corner flow on downstream fitted flaps [ESA-TT-583] N83-24480
Project Biramis: Measurement of the Earth radiation budget by accelerometric satellite [ESA-TT-761] N83-25243

EVALUATION ASSOCIATES, INC., BALA CYNWYD, PA.
Reliability and availability evaluation program manual [AD-A124294] N83-24869

EXIDE MANAGEMENT AND TECHNOLOGY CO., YARDLEY, PA.
Report for 1981 on research, development and demonstration of nickel-zinc batteries for electric vehicle propulsion [ANL/OPEM-81-12] N83-25045

EXXON NUCLEAR IDAHO CO., INC., IDAHO FALLS.
Autoignition of kerosene in fluidized-bed pilot-plant calciners [DE82-008764] N83-24610

F

F AND K GROUP, NEW YORK, N.Y.
CEI-1 lighting computer program. Programmer's guide [AD-A124215] N83-25399

FAIRCHILD SPACE AND ELECTRONICS CO., GERMANTOWN, MD.
A high strength, torsionally rigid, deployable and retractable mast for space applications N83-24892

FAIRCHILD WESTON SYSTEMS, INC., SARASOTA, FLA.
The DOE/NASA wind turbine data acquisition system. Part 3: Unattended power performance monitor [NASA-CR-165540] N83-24516

FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Crash injury protection in survivable air transport accidents: United States civil aircraft experience from 1970 through 1978 (incomplete) [FAA-CT-82-118] N83-24489
Evaluation of Precision Approach Path Indicator (PAPI) [FAA-CT-82-153] N83-24495
Analysis of dissipation of gaseous extinguisher agents in ventilated compartments [FAA-CT-83-1] N83-24805

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Advanced Automation System (AAS) transition strategy [FAA-AP-83-1] N83-24493
National Airspace System Plan, facilities, equipment and associated development N83-24521
The effects of physical fatigue and altitude on physiological, biochemical, and performance responses [AD-A122796] N83-25357
Helicopter noise exposure curves for use in environmental impact assessment [AD-A123467] N83-25500

FELS RESEARCH INST., YELLOW SPRINGS, OHIO.
Longitudinal study of human hearings: Its relationship to noise and other factors. 3: Results from the first five years [AD-A123175] N83-25355

FERMI NATIONAL ACCELERATOR LAB., BATAVIA, ILL.
Sensitive and simple method for measuring wire tensions [DE82-021918] N83-24738

FLORIDA INTERNATIONAL UNIV., MIAMI.
Energy-related pollution of semi-tropical and tropical nearshore ecosystems [DE83-005136] N83-25237

FLORIDA UNIV., GAINESVILLE.
Preliminary analysis of an FM/CW system operating over a distributed flat-surface target [AD-A124323] N83-24755
Analysis of long bone and vertebral failure patterns [AD-A123163] N83-25356

FLOW RESEARCH, INC., KENT, WASH.
Calculation of transonic potential flow around a wing-body-tail combination [AD-A124247] N83-24482

G

GARD, INC., NILES, ILL.
Development of a condenser for the dual catalyst water recovery system [NASA-CR-166478] N83-25372

GCA CORP., BEDFORD, MASS.
Material balance in atmospheric fluidized-bed combustion of North Dakota lignite [DE82-020853] N83-24615

GENERAL ACCOUNTING OFFICE, WASHINGTON, D. C.
San Francisco's wastewater treatment program needs reexamination and better management [GAO/MASAD-83-11] N83-25220
Analysis of the comprehensive energy emergency response procedures report [GAO/RCED-83-106] N83-25624

GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Solar production of hydrogen using the sulfur-iodine thermochemical water-splitting cycle [DE83-005826] N83-24723
The sulfur-iodine thermochemical water-splitting cycle N83-25062
Compact toroidal plasmas: Simulations and theory [DE82-018107] N83-25567

GENERAL DYNAMICS/CONVAIR, SAN DIEGO, CALIF.
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 1: Executive summary [NASA-CR-171661] N83-24526
Space Construction Experiment Definition Study (SCEDS), part 3. Volume 2: Study results [NASA-CR-171660] N83-24527

GENERAL DYNAMICS CORP., FORT WORTH, TEX.
Integrated methodology for adhesive bonded joint life predictions [AD-A124324] N83-24701

GENERAL DYNAMICS/FORT WORTH, TEX.
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 4 [AD-A123307] N83-25406
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 1 [AD-A123304] N83-25407
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 2 [AD-A123305] N83-25408
Large scale software system design of the AN/TYC-39 store and forward message switch using the Ada programming language, volume 3 [AD-A123306] N83-25409

GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Initial detailed designs for intermediate photovoltaic systems: Office building [DE83-005365] N83-25172
Computer Software Program Plan (CSPP) [TIS-83-SDS-008] N83-25392
Design and development of a laminated Fresnel lens for point-focus PV systems, phase 2 [DE83-005935] N83-25560

GENERAL ELECTRIC CO., SUNNYVALE, CALIF.
Inelastic analysis of dissimilar metallic pipe joints for CRBRP application [DE82-011435] N83-24913

GENERAL ELECTRIC CO., WILMINGTON, MASS.
Status of the development of solid polymer electrolyte water electrolysis for large scale hydrogen generation N83-25058
Recovery of hydrogen from hydrogen sulfide N83-25066

GEODATA INTERNATIONAL, INC., DALLAS, TEX.
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 1: General narrative report [DE82-011041] N83-25014
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data [DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data [DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps [DE82-009647] N83-25017

GEOLOGICAL SURVEY, FLAGSTAFF, ARIZ.
A Catalog of Selected Viking Orbiter Images [NASA-RP-1093] N83-25636

GEOLOGICAL SURVEY, WASHINGTON, D. C.
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf [USGS-CIRC-861] N83-24921
Geological studies of the COST Nos. G-1 and G-2 wells, United States North Atlantic Outer Continental Shelf: Introduction N83-24922
Geologic setting of the Georges Bank Basin N83-24923
Lithology and petrography of the COST Nos. G-1 and G-2 wells N83-24924
Calcareous nannofossil biostratigraphy and paleoenvironment of the COST Nos. G-1 and G-2 wells in the Georges Bank Basin N83-24925
Foraminiferal and seismic stratigraphy, paleoenvironments and depositional cycles in the Georges Bank Basin N83-24926
Significance of the Mesozoic carbonate bank-reef sequence for the petroleum geology of the Georges Bank Basin N83-24927
Organic geochemistry of the Georges Bank Basin COST Nos. G-1 and G-2 wells N83-24928
Thermal history of the Georges Bank Basin N83-24929
Geophysical studies of the COST Nos. G-1 and G-2 wells N83-24930
Basement structure, sedimentation and tectonic history of the Georges Bank Basin N83-24931
GESELLSCHAFT FUER SCHWERIONENFORSCHUNG M.B.H., DARMSTADT (WEST GERMANY).
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer [DE82-020067] N83-25509
GIESSEN UNIV. (WEST GERMANY).
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer [DE82-020067] N83-25509
GRAMBLING STATE UNIV., LA.
Turbulence in transient solar phenomena [NASA-CR-170315] N83-25640
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
High temperature active heat exchanger research for latent heat storage N83-25091
GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.
Design and fabrication of realistic adhesively bonded joints [NASA-CR-168099] N83-24876

H

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Swelling behavior of 20% CW316 stainless steel cladding irradiated with and without adjacent fuel [DE82-020501] N83-24683
Thermal NDE method for thermal spray coatings [DE82-020641] N83-24872
HARRY DIAMOND LABS., ADELPHI, MD.
Rayleigh's method applied to a conducting liquid drop in the presence of a point charge [AD-A123670] N83-24776
HARVARD UNIV., CAMBRIDGE, MASS.
Drift mobilities by time-of-flight methods and time-dependent phototransport in the nanosecond regime in amorphous semiconductors [DE83-004523] N83-25611
HAWAII UNIV., HONOLULU.
Research in planetary astronomy and operation of Mauna Kea Observatory [NASA-CR-170246] N83-25631
HERCULES, INC., MAGNA, UTAH.
On the effects of spherical fillers on the viscosity of short-fiber reinforced plastics [DE82-021843] N83-24705
HIDBITT, KARLSSON AND SORENSEN, PROVIDENCE, R.I.
ABAQUS-EPGEN: A general-purpose finite-element code. Volume 1: User's manual [DE83-900754] N83-25418
HIGH LIFE HELICOPTERS, INC., PUYALLUP, WASH.
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 1: General narrative report [DE82-011041] N83-25014
Aerial radiometric and magnet survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 2: Radiometric multivariable stacked profile data [DE82-009640] N83-25015
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 3: Magnetic and ancillary stacked profile data [DE82-009646] N83-25016
Aerial radiometric and magnetic survey. Marysvale detail survey, Richfield National Topographic Map sheet, Utah. Volume 4: Graphic data maps [DE82-009647] N83-25017
HONEYWELL, INC., MINNEAPOLIS, MINN.
Demonstration Advanced Avionics System (DAAS). Phase 1 report [NASA-CR-170317] N83-24504
HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
ACOSS-16 (Active Control of Space Structures) [AD-A123540] N83-24546
Spectrophotovoltaic orbital power generation [NASA-CR-170754] N83-25040
HOUSTON UNIV., TEX.
Measurement of residual stress using the temperature dependence of ultrasonic velocity [AD-A123694] N83-25593
HOWARD UNIV., WASHINGTON, D. C.
Raman investigation of the effects of fused silica fibers [AD-A123549] N83-25553
HSS, INC., BEDFORD, MASS.
Development of an airborne visibility meter [AD-A124276] N83-25327
HUGHES RESEARCH LABS., MALIBU, CALIF.
Optical time domain reflectometry fiber studies [AD-A123682] N83-25550
HYDROCARBON RESEARCH, INC., LAWRENCEVILLE, N. J.
Laboratory program to support H-coal pilot-plant operations: Volume 2: PDU run 8 [DE82-008213] N83-25187

I

IBM RESEARCH LAB., SAN JOSE, CALIF.
Reading and writing of photochemical holes using GaAlAs diode lasers [AD-A124633] N83-24846
ILLINOIS INST. OF TECH., CHICAGO.
Feasibility of cogenerated district heating and cooling for North Loop project [DE83-005654] N83-25125
Feasibility case study of gas-turbine direct-heat industrial cogeneration [DE83-005655] N83-25126
Feasibility of a small central cogenerated energy facility: Energy management memorandum [DE83-005083] N83-25211
ILLINOIS STATE WATER SURVEY, CHAMPAIGN.
Raingage network sampling statistics N83-25286
ILLINOIS UNIV., CHICAGO.
Use of the optimal polarization concept in electromagnetic imaging of hydrometeor distributions N83-25313
Bib designs with blocks of maximal multiplicity [AD-A123220] N83-25492
ILLINOIS UNIV., URBANA.
Analysis of the suspended H-waveguide and other related dielectric waveguide structures [AD-A124342] N83-24757
Adjustment of design parameters for improved feedback properties in the linear quadratic regulator [AD-A124494] N83-24782
Global Dynamics of Biospheric Carbon. Proceedings of Symposium [CONF-8108131] N83-25223
On the measurement of precipitation frequencies by passive microwave radiometery N83-25303
Natural language processing using spreading activation and lateral inhibition [AD-A123427] N83-25415
Computational methods and software for ODES and their applications [DE82-020803] N83-25422
Boolean expressions of rectilinear polygons with VLSI applications [AD-A124691] N83-25461
The restricted Stackelberg problem [AD-A124638] N83-25488
Minimax robustness in communication and control [AD-A124639] N83-25489
Formation of silicon nitride structures by direct electron-beam writing [AD-A124344] N83-25588
Encapsulation and implantation studies of InP [AD-A124388] N83-25590
ILLINOIS UNIV., URBANA-CHAMPAIGN.
Orientation of ceramic microstructures by hot-forming methods [DE83-005232] N83-24707
X-ray-diffraction study of vacancies in bcc helium-3 and bcc helium-4 [DE82-020141] N83-25607
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
The role of hydrogen in the stress corrosion failure of high strength Al-Zn-Mg alloys [AD-A123693] N83-24644
Calculations and measurements of the flow in a motored model engine and implications for open-chamber direct-injection engines [DE83-019033] N83-24868
INDIANA UNIV., BLOOMINGTON.
Metal-metal bonds and metal carbon bonds in the chemistry of molybdenum and tungsten alkoxides [AD-A124298] N83-24581
Signal-to-noise considerations in Fluctuation Analysis Spectroscopic Techniques (FAST) [AD-A123698] N83-24585
INSTITUTE FOR DEFENSE ANALYSES, ALEXANDRIA, VA.
Impedance and current of insulated and end-grounded linear antennas in seawater [AD-A123345] N83-24751
INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.
Advanced high-temperature thermal energy storage media for industrial applications N83-25082
Environmental assessment of the HYGAS process. Volume 4: HYGAS environmental characterization. HYGAS tests 65 through 76 [DE82-011012] N83-25231
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Determination of artificial satellite attitude by estimates of state [INPE-2606-TDL/105] N83-24530
A 40 MHz - 2.2 MHz downconverter [INPE-2607-NTE/194] N83-24770
A new theory of cylindrical shells [INPE-2714-RPE/431] N83-24907
Application of LANDSAT images to the mapping and management of the rangelands of the Gungu area (Zaire) [E83-10300] N83-24993
Perspectives in remote sensing in Brazil. An approach of the remote sensing applications to Earth resources surveys [E83-10290] N83-24994
Amtospheric correction analysis on LANDSAT data over the Amazon region [E83-10298] N83-25001
Methodology of remote sensing data interpretation and geological applications [E83-10299] N83-25002
Radiation balance of soybeans grown in Brazil [INPE-2709-PRE/297] N83-25005
Maximum entropy spectral analysis of geomagnetic disturbance indices [INPE-1693-RPE/120] N83-25242
A study on the viability of preciptation forecasting in northeastern Brazil from 1 to 9 months [INPE-2628-TDL/111] N83-25318
Development of translational image registration techniques [INPE-2634-RPE-427] N83-25389
Resource allocation: COPLAN/RAM system user's manual [INPE-2614-NTE/196] N83-25391
Image registration by sequential tests of hypotheses: Gaussian and binomial techniques [INPE-2710-PRE/298] N83-25437
Vectoral fields, linear spaces, and tensors in physics. Part 2: Linear operators, matrices, and autovalues [INPE-2565-MD/020-PT-2] N83-25613
An interactive system for project control and planning [INPE-2620-TDL/107] N83-25614
Diameters of O type stars based on ultraviolet observations [INPE-2692-PRE/290] N83-25632
Ultraviolet lines from emission line giants [INPE-2690-PRE/289] N83-25633
The Brazilian Solar Physics Program and results from the energy of solar flares [INPE-2631-PRE/258] N83-25642
Microwave and X-ray emission during an isentropic expansion and their application to solar flares [INPE-2617-TDL/106] N83-25643
Sub-second pulsations simultaneously observed at microwaves and hard X-rays in a solar burst [INPE-2672-PRE/281] N83-25644
INSTITUTO DE PESQUISAS ESPACIAIS, SAO PAULO (BRAZIL).
Application of remote sensing to urban studies [INPE-2625-NTE/197] N83-25004
Report on the status at DSR/INPE on applying remote sensing to geology [INPE-2633-RPE/426] N83-25239
Synoptic meteorology, part 1 [INPE-2605-MD/021] N83-25319

Microwave laboratory computer program library
[INPE-2613-NTE/195] N83-25390

INTERNATIONAL COAL REFINING CO., BIRMINGHAM, ALA.
SRC-1 coal-liquefaction demonstration plant project baseline assessment report
[DE82-013863] N83-24827

IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Performance of tornado-type wind turbines with radial inflow supply N83-25044

IOWA UNIV., IOWA CITY.
A FORTRAN program for isotonic regression in two independent variables
[AD-A123510] N83-25397
A FORTRAN program for the level probabilities of order restricted inference
[AD-A123511] N83-25477

ITEK CORP., LEXINGTON, MASS.
Vertically fused face sheet performance
[AD-A123420] N83-25557

J

JBF SCIENTIFIC CORP., WILMINGTON, MASS.
Analysis of the effects of integrating wind turbines into a conventional utility: A case study
[PNL-1962-REV] N83-25049

JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
Stabilized lanthanum sulphur compounds
[NASA-CASE-NPO-16135-1] N83-24572
Propellant/material compatibility program and results: Ten-year milestones
[NASA-CR-170346] N83-24710
Influence of liquid water and water vapor on antimisting kerosene (AMK)
[NASA-CR-170280] N83-24711
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit
[NASA-CASE-NPO-16021-1] N83-24769
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
The 17th Aerospace Mechanisms Symposium
[NASA-CP-2273] N83-24881
The linear boom actuator designed for the Galileo spacecraft N83-24886
Nutation Damper System N83-24895
Design of the Galileo remote science pointing actuators N83-24902
Silicon ingot casting: Heat Exchange Method (HEM). Multi-wire slicing: Fixed Abrasive Slicing Technique (FAST). Phase 3 and phase 4: Silicon sheet growth development for the large area sheet task of the low-cost solar array project
[NASA-CR-170213] N83-25027
Origin of SiC impurities in silicon crystals grown from the melt in vacuums N83-25032
Proceedings of the Flat-Plate Solar Array Workshop on the Science of Silicon Material Preparation
[NASA-CR-170318] N83-25034
Solubility of sulfur dioxide in sulfuric acid N83-25063
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217
System and method for moving a probe to follow movements of tissue
[NASA-CASE-NPO-15197-1] N83-25346
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

JOHNS HOPKINS UNIV., BALTIMORE, MD.
Ionic aspects of soot formation
[DE82-020799] N83-24619
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570

K

KALAMAZOO COLL., MICH.
Modeling heat transfer in PCM's with the Budak method N83-25077

KANNER (LEO) ASSOCIATES, REDWOOD CITY, CALIF.
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793

KANSAS UNIV. CENTER FOR RESEARCH, INC., LAWRENCE.
Ride quality systems for commuter aircraft
[NASA-CR-166118] N83-24512
Calculation of wing response to gusts and blast waves with vortex lift effect
[NASA-CR-170340] N83-24796
Use of combined radar and radiometer systems in space for precipitation measurement: Some ideas N83-25312
Study of noise reduction characteristics of double-wall panels
[NASA-CR-170308] N83-25497

KEO CONSULTANTS, BROOKLINE, MASS.
Low light level imaging design
[AD-A124283] N83-25547

KERR-MCGEE CORP., OKLAHOMA CITY.
Applications of multiproperty analysis in the prediction of complex-system thermophysical behavior
[DE82-020859] N83-24603

KING RADIO CORP., OLATHE, KANS.
Demonstration Advanced Avionics System (DAAS). Phase 1 report
[NASA-CR-170317] N83-24504

KMS FUSION, INC., ANN ARBOR, MICH.
Increasing the effective bandwidth of a laser-fusion driver
[DE82-015170] N83-24847

KO (KENNETH C.) AND ASSOCIATES, DENVER, COLO.
Effects on soils from hot storage tanks N83-25085

L

LASER DIODE LABS., INC., NEW BRUNSWICK, N.J.
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence
[AD-A124300] N83-24582

LEHIGH UNIV., BETHLEHEM, PA.
Catalysts for alcohols from biomass
[DE83-003611] N83-24630
Effect of test frequency and water content on localized crack-tip heating in Nylon 66
[AD-A124156] N83-24910

LIFE SYSTEMS, INC., CLEVELAND, OHIO.
Static feed water electrolysis for large scale hydrogen generation N83-25059

LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Maximum likelihood estimation in monopulse problems. Part 1. The structure of the estimators
[AD-A124301] N83-24745
Advanced electronic technology
[AD-A123581] N83-24779
Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors
[DOE/ET-20279/162] N83-25053
Data report for the Southwest Residential Experiment Station, December 1981
[DOE/ET-20279/184] N83-25054
Data report for the Northeast Residential Experiment Station, November 1981
[DOE/ET-20279/182] N83-25055
Power processing subsystems for the 100-kWp solar-photovoltaic-power system at the Natural Bridges National Monument in Utah
[DE83-005246] N83-25169
Seismic discrimination
[AD-A124322] N83-25254
Solid state research
[AD-A124305] N83-25592

LITTLE (ARTHUR D.), INC., CAMBRIDGE, MASS.
Wind-turbine-performance assessment
[DE82-905281] N83-25152
Development, application, and evaluation of a value-impact methodology for prioritization of reactor-safety R and D projects
[DE82-906486] N83-25621

LOCKHEED-CALIFORNIA CO., BURBANK.
Analytical modeling of transport aircraft crash scenarios to obtain floor pulses
[NASA-CR-166089] N83-24488

LOCKHEED-GEORGIA CO., MARIETTA.
Integrated assurance assessment of a reconfigurable digital flight control system
[NASA-CR-170281] N83-24515

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Development of heat-storage building materials for passive-solar applications
[DE82-020804] N83-24735

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Materials problems in fluidized-bed-combustion and coal-gasification systems: Further studies of corrosion chemistry in low-oxygen activity atmospheres
[DE82-905772] N83-25182

LOCKHEED MISSILES AND SPACE CO., SUNNYVALE, CALIF.
High-speed machining of Space Shuttle External Tank (ET) panels
[NASA-CR-170751] N83-24537
High-Speed Machining (HSM) of Space Shuttle External Tank (ET) panels
[NASA-CR-170738] N83-24727

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Study of certain plane spiral deflecting systems of traveling-wave tubes
[DE83-005024] N83-24792
Dispersion properties of spiral deflecting systems
[DE83-005025] N83-24793
Long titanium heat pipes for high-temperature space radiators
[DE82-014069] N83-24819
Artery heat pipes for space-power systems
[DE82-015445] N83-24822
Bonded stacked-ring insulator for the Antares electron gun
[DE82-017586] N83-24851
Calculation of three-dimensional distributions of current density, electric field and power deposition in externally sustained electrical discharges
[DE82-021880] N83-24853
Los Alamos passive test cell results for the 1981-82 winter
[DE83-002948] N83-25129
Los Alamos National Laboratory solar program
[DE82-021760] N83-25143
Development of high-temperature liquid-metal heat pipes for isothermal irradiation assemblies
[DE82-016073] N83-25147
Potential for hot-dry-rock geothermal resources: Experimental results
[DE82-019534] N83-25155
Differential-absorption LIDAR technology for light twin-engine aircraft operation
[DE83-003888] N83-25232
Induced fractures: Well stimulation through fracturing
[DE82-019554] N83-25262
Diurnal variability of wind velocity increase with height
[DE83-005804] N83-25336
LENS* 4: A program for calculation of geometric optics of the human eye
[DE83-003890] N83-25366
The impact of security controls on computing productivity
[LA-9214-MS] N83-25380
Using a batch processor to create an interactive menu-driven operating system
[LA-9205-MS] N83-25381
Implementation of a fully reconfigurable multimicroprocessor
[DE82-021769] N83-25384
FITS: A function-fitting program
[LA-9111-M] N83-25393
SUBMAP manual: Subroutine mapping program
[DE82-021836] N83-25420
Experiences with distributing graphic software between processors
[DE82-019559] N83-25424
Aspects of model selection in multivariate analyses
[DE82-019576] N83-25483
Rapid vibrational and rotational energy-transfer rates in heated carbon dioxide collisions by double-resonance laser spectroscopy
[DE82-021844] N83-25515
Flight systems safety program
[DE82-021833] N83-25529
Radiolytic effects on ion exchangers during the storage of radioactive wastes
[DE82-019551] N83-25533
Disposal of liquid radioactive wastes through wells or shafts
[DE82-008944] N83-25534
Simulation of plasma double-layer structures
[NASA-CR-170279] N83-25563
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
US program in heavy-ion fusion
[DE82-015769] N83-25568
Historical perspective of mass storage
[DE82-018376] N83-25616

LOUISIANA STATE UNIV., BATON ROUGE.
Spectroscopy and photochemistry of aromatic and cyclic beta-diketones
[DE82-019296] N83-24609

LULEA UNIV. (SWEDEN).
Heat storage in rock: Multiple well system
[TULEA-1981:28] N83-25048
Active earth pressure build-up. A trigger mechanism in large landslides in sensitive (Quick) clays
[TR-1981:49T] N83-25240

The Stiffness of Joints
[TULEA-1981:22] N83-25241
LUNAR AND PLANETARY INST., HOUSTON, TEX.
Use of basaltic magmas to characterize processes in planetary interiors: A test case in the southwestern United States
[NASA-CR-170311] N83-25638

M

M/A-COM LINKABIT, INC., SAN DIEGO, CALIF.
A robust ratio-threshold technique to mitigate tone and partial band jamming in coded frequency hopped communication links
[AD-A123559] N83-24753
MAGNAVOX CO., FORT WAYNE, IND.
Solid state EMC technology Development
[AD-A123705] N83-24749
MARINE ENVIRONMENTS CORP., MANASSAS, VA.
Assessment of surface wave effects on upper ocean parameters
[AD-A124637] N83-25341
MARTIN MARIETTA AEROSPACE, DENVER, COLO.
Molten salt thermal energy storage subsystem for solar thermal central receiver plants N83-25083
MARTIN MARIETTA AEROSPACE, ORLANDO, FLA.
Cannon launched electromechanical control actuation system development N83-24893
MARTIN MARIETTA CORP., DENVER, COLO.
Advanced earth observation spacecraft computer-aided design software: Technical, user and programmer guide
[NASA-CR-166063] N83-24544
Tethered satellite control mechanism N83-24882
Polarizer mechanism for the space telescope faint object spectrograph N83-24887
The manned maneuvering unit flight controller arm N83-24897
MARTIN MARIETTA LABS., BALTIMORE, MD.
Mechanical properties of adhesively bonded aluminum structures protected with hydration inhibitors
[AD-A123403] N83-24703
MARYLAND UNIV., COLLEGE PARK.
Investigation of cold cathode and RF excitation for long life CO2 waveguide lasers
[AD-A123178] N83-24845
Application of hierarchical data structures to geographical information systems
[AD-A124196] N83-25617
MASON (VIRGINIA) RESEARCH CENTER, SEATTLE, WASH.
Interaction of anti-G measures and chest wall mechanics in determining gas exchange
[AD-A122297] N83-25365
MASON AND HANGER-SILAS MASON CO., INC., AMARILLO, TEX.
Mallet impact test
[DE83-001841] N83-24718
MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Cure monitoring and control with combined dielectric/temperature probes
[AD-A123512] N83-24564
Critical studies of the rapid pyrolysis and hydropyrolysis of coal
[DE83-000101] N83-24596
Catalytic hydrodenitrogenation of quinoline in a trickle-bed reactor. Comparison with vapor-phase reaction
[DE82-019424] N83-24625
Micromechanical modeling of microstructural damage in creeping alloys
[DE82-009141] N83-24677
Understanding dielectric cure monitoring
[AD-A123507] N83-24834
On the complexity of designing distributed protocols
[AD-A123300] N83-25401
Studies in remote sensing, astronomy and general physics
[RLE-PR-124] N83-25493
Role of radiation on the power balance of the Alcator C Tokamak
[DE83-005441] N83-25575
High-energy-ion depletion in the charge exchange spectrum of Alcator C
[DE82-021690] N83-25577
Structure of large-angle grain boundaries in metals and ceramic oxides
[DE82-022006] N83-25608
MATERIALS CONSULTANT ASSOCIATES, INC., PELL CITY, ALA.
Development of chemically bonded ceramic materials for use in thermal-energy-storage devices
[DE82-020827] N83-24704
MAX-PLANCK-INSTITUT FUER STROEMUNGSFORSCHUNG, GOETTINGEN (WEST GERMANY).
The FO2 radical and LMR spectra in reactions of fluorine atoms
[ISSN-0436-1199] N83-25506
MCC ASSOCIATES, INC., SILVER SPRING, MD.
Proceedings of the Sixth Annual Thermal and Chemical Storage Contractors' Review Meeting
[CONF-810940] N83-25057
MCCRAY (JAMES), MADISON, WIS.
Low-cost process-heat recovery
[DE82-016652] N83-25138
MCDONNELL-DOUGLAS ASTRONAUTICS CO., ST. LOUIS, MO.
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171655] N83-24550
LOX/hydrocarbon auxiliary propulsion system study
[NASA-CR-171656] N83-24551
Two hundred passage three-way valve: Fraction collector N83-24894
MCDONNELL-DOUGLAS RESEARCH LABS., ST. LOUIS, MO.
Microstructure and properties of powder-processed aluminum-lithium alloys
[AD-A123165] N83-24646
MCGILL RADAR WEATHER OBSERVATORY, STE. ANNE DE BELLEVUE (QUEBEC).
A combined visible and IR technique for the estimation of rainfall amounts from GOES data N83-25294
MCGILL UNIV., MONTREAL (QUEBEC).
Combining visible and infrared techniques with LAMMR for daily rainfall estimates N83-25301
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).
Experimental tests on accelerometers and pressure transducers for cryogenic wind-tunnel models
[N/FE123/S/PUB/77] N83-24517
Parameter and design studies for the use of wind tunnel models in the ETW
[MBB/FE123/S/PUB/83] N83-24518
MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Basic investigations for the use of wind tunnel models in the ETW
[BMFT-FB-W-82-023] N83-24522
MIAMI UNIV., FLA.
Satellite borne dual millimetric wave length radar N83-25309
MICHIGAN STATE UNIV., EAST LANSING.
A study of the effects of Lebu devices on turbulent boundary layer drag
[NASA-CR-170313] N83-24469
MICHIGAN UNIV., ANN ARBOR.
Capabilities and potential of millimeter-wave IMPATT devices
[AD-A123380] N83-24781
Classification of journal surfaces using surface topography parameters and software methods to compensate for stylus geometry
[NASA-CR-168153] N83-24857
Appraisal of LANDSAT lineaments as faults in Western Kentucky
[DE83-005412] N83-25019
Structural geology of the Moorman syncline area of western Kentucky
[DE82-022305] N83-25258
Estimating regression coefficients from clustered samples: Sampling errors and optimum sample allocation
[NASA-CR-166117] N83-25496
MIDWEST RESEARCH INST., GOLDEN, COLO.
Electrochemistry applied to thermal conversion
[DE83-005212] N83-24633
Commercial Photovoltaics Measurements Workshop Proceedings
[SERI/CP-214-1403] N83-25093
Terrestrial solar spectral modeling N83-25104
Predicting energy savings attributed to daylighting
[DE82-022038] N83-25134
Daylight and daylighting laboratory at the Solar Energy Research Institutue
[DE82-019255] N83-25135
Ablative fast pyrolysis of biomass in the entrained-flow cyclonic reactor at SERI
[DE82-019768] N83-25144
Wind-energy program
[DE82-014199] N83-25150
Catalog of automatic Sun-following trackers
[DE83-005529] N83-25178
Heat rejection and energy extraction within solar ponds
[DE82-009487] N83-25196
Stress corrosion of a high-transmittance glass for solar applications
[DE82-009721] N83-25197
Protecting wind access: A preliminary assessment
[DE82-019128] N83-25333
MIDWEST RESEARCH INST., KANSAS CITY, MO.
Future availability of catalyst metals for synfuel processes
[DE82-015628] N83-24618
MINNESOTA UNIV., MINNEAPOLIS.
Continuous chemical-reaction chromatography
[DE82-010447] N83-24594
MISSISSIPPI METHODIST REHABILITATION CENTER, JACKSON.
Orthotic devices using lightweight composite materials
[NASA-CR-166105] N83-24560
MISSISSIPPI STATE UNIV., MISSISSIPPI STATE.
Transformation of two and three-dimensional regions by elliptic systems
[NASA-CR-170310] N83-25430
MISSOURI UNIV., ROLLA.
Alcohol/petroleum systems as fuels for diesel engines
[DE82-020752] N83-24721
Collisions of fast highly charged ions in gas targets: Ionization, recoil-ion production and charge transfer
[DE82-020067] N83-25509
MITRE CORP., BEDFORD, MASS.
Bistatic surface clutter resolution area at small grazing angles
[AD-A123660] N83-24746
MITRE CORP., MCLEAN, VA.
Technology assessment of solar-energy systems. Materials resource and hazardous materials impacts of solar deployment
[DE83-005048] N83-25215
MITSUBISHI ELECTRIC MFG. CO. LTD., AMAGASAKI (JAPAN).
A compact magnetic bearing for gimballed momentum wheel N83-24903
MOBIL RESEARCH AND DEVELOPMENT CORP., PAULSBORO, N. J.
Analytical studies for the H-coal process
[DE82-019835] N83-24601
MONSANTO RESEARCH CORP., MIAMISBURG, OHIO.
Summary of the ultrafiltration, reverse osmosis, and adsorbents project
[DE83-005635] N83-25536
MONTANA STATE UNIV., BOZEMAN.
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604
MOTOROLA, INC., PHOENIX, ARIZ.
Role of impurities in silicon solar cell performance N83-25099
MOUND LAB., MIAMISBURG, OHIO.
Ultrafiltration/reverse osmosis (liquid treatment systems)
[DE82-020775] N83-24607
Direct bonding of molybdenum and niobium feedthroughs in electronic grade alumina
[DE82-005668] N83-24676
Aluminum surface-film growth in AlFe3O4 thermites during accelerated aging
[DE82-021903] N83-24686
Reproducibility of an automated laser Raman system for light gas analysis
[MLM-2804] N83-24841
Pelletized-waste-form demonstration program, October 1981 - March 1982
[DE82-015832] N83-25531
Development of low-level liquid-waste-treatment systems, October 1981 - March 1982
[DE82-016255] N83-25532
MOUNTAIN STATES ENERGY, INC., BUTTE, MONT.
Environmental monitoring
[DE82-021559] N83-25228
MPD TECHNOLOGY CORP., WYCKOFF, N.J.
Metal hydride process for hydrogen recovery N83-25065

N

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
Safety issues related to synthetic-fuels facilities
[DE82-017671] N83-24739
Workshop Report on Basic Research in Organic Geochemistry Applied to National Energy Needs
[CONF-801249] N83-25051
Massively parallel processor computer
[NASA-CASE-GSC-12223-1] N83-25378
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering. A continuing bibliography with indexes, supplement 160, April 1983
[NASA-SP-7037(160)] N83-24466

Technology for large space systems: A bibliography with indexes
[NASA-SP-7046(07)] N83-24525
The space technology demand on materials and processes
[NASA-TM-77041] N83-24528
European X-ray observatory satellite (Exosat)
[NASA-NEWS-RELEASE-83-74] N83-24532
Organome derivatives of phenylethers, 2
[NASA-TM-77020] N83-24555
Cost of phosphate removal in municipal wastewater treatment plants
[NASA-TM-77060] N83-24573
Design optimization of high-performance electrodynamic actuators for use in a cryogenically cooled telescope N83-24888
Energy. A continuing bibliography with indexes, issue 36, January 1983
[NASA-SP-7043(36)] N83-25025
Precipitation measurements for earth-space communications: Accuracy requirements and ground-truth techniques N83-25292
Aerospace Medicine and Biology: A cumulative index to the 1982 issues
[NASA-SP-7011(241)] N83-25347
Space Physiology and Medicine
[NASA-SP-447] N83-25349

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.

Trends of Reynolds number effects on two-dimensional airfoil characteristics for helicopter rotor analyses
[NASA-TM-84363] N83-24472
The effect of asymmetric attack on trim angle of attack
[NASA-TM-84309] N83-24473
The 1st Symposium on Chemical Evolution and the Origin and Evolution of Life
[NASA-CP-2276] N83-24556
Comparison of multispectral remote-sensing techniques for monitoring subsurface drain conditions
[NASA-TM-84317] N83-25003
Extended near infrared emission from visual reflection nebulae
[NASA-TM-85315] N83-25629
First detection of the ground state JK = 1 sub 0 going to 0 sub 0 submillimeter transition of interstellar ammonia
[NASA-TM-84359] N83-25630

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. EARTH RESOURCES LABS., BAY ST. LOUIS, MISS.

AN-A48. LANDSAT scene-to-scene registration assessment
[E83-10294] N83-24997

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

Performance interface document for users of Tracking and Data Relay Satellite System (TDRSS) electromechanically steered antenna systems (EMSAS)
[NASA-TM-84953] N83-24545
Microcircuit radiation effects databank
[NASA-TM-85328] N83-24771
Calculations of radar backscattering coefficient of vegetation-covered soils
[E83-10291] N83-24995
The influence of snow depth and surface air temperature on satellite-derived microwave brightness temperature
[E83-10297] N83-25000
Precipitation Measurements From Space: Workshop report. An element of the climate observing system study
[NASA-TM-85329] N83-25269
Summary of requirements and recommendations N83-25270
Sampling problems N83-25271
Ground-truth measurement systems N83-25272
Visible and infrared techniques N83-25273
Microwave radiometry and hybrid precipitation measurements N83-25274
Spaceborne radar N83-25275
A brief review of the present status of global precipitation estimates N83-25276
Precipitation measurement requirements for general circulation climate model development and applications N83-25277
Precipitation data for climate diagnostics N83-25278
Severe storms requirements for precipitation information N83-25281
On the effect of temporal sampling on the observation of mean rainfall N83-25285
Inference of precipitation through thermal infrared measurements of soil moisture N83-25298
A survey of passive microwave and hybrid remote sensing of precipitation N83-25299
The utilization of satellite passive microwave sensors to monitor synoptic scale rainfall N83-25305
The DMSP imager (SSMI): Unfinished plans N83-25306
Remote sensing of stored precipitation, i.e., soil moisture and snow N83-25307
Spaceborne precipitation radar N83-25308
Adaptively pointing spaceborne radar for precipitation measurements N83-25315
The outlook for precipitation measurements from space N83-25316
Evaluation of the synoptic and mesoscale predictive capabilities of a mesoscale atmospheric simulation system
[NASA-TM-84995] N83-25317
Massively parallel processor computer
[NASA-CASE-GSC-12223-1] N83-25378
Fine-scale structure of the Jovian magnetotail current sheet
[NASA-TM-85014] N83-25639

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. JOHN F. KENNEDY SPACE CENTER, COCOA BEACH, FLA.

Payload retention fittings for space shuttle payload ground handling mechanism N83-24906

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.

Loads and performance data from a wind-tunnel test of model articulated helicopter rotors with 2 different blade torsional stiffnesses
[NASA-TM-84573] N83-24471
Effects of twin-vertical-tail parameters on twin-engine afterbody/nozzle aerodynamic characteristics
[NASA-TP-2158] N83-24478
A simulation study of crew performance in operating an advanced transport aircraft in an automated terminal area environment
[NASA-TM-84610] N83-24490
Flow rate/pressure drop data gathered from testing a sample of the Space Shuttle Strain Isolation Pad (SIP): Effects of ambient pressure combined with tension and compression conditions
[NASA-TM-84591] N83-24542
Buckling and failure characteristics of graphite-polyimide shear panels
[NASA-TP-2153] N83-24561
Failure mechanics in low-velocity impacts on thin composite plates
[NASA-TP-2152] N83-24562
Pyroelectric detector arrays
[NASA-CASE-LAR-12363-2] N83-24763
Numerical computations on one-dimensional inverse scattering problems
[NASA-CR-166114] N83-24766
Aerothermal environment in control surface gaps in hypersonic flow: An overview
[NASA-TM-84662] N83-24794
Calculation of inviscid flow over shuttle-like vehicles at high angles of attack and comparisons with experimental data
[NASA-TP-2103] N83-24808
Control of large thermal distortions in a cryogenic wind tunnel N83-24889
Securing mechanism for the deployable column of the Hoop/Column antenna N83-24891
Practical small-scale explosive seam welding N83-24896
Beaufort/Bering 1979 microwave remote sensing data catalog report, 14-24 March 1979
[NASA-TM-84609] N83-25337
Cumulative reports and publications thru 31 December 1982
[NASA-CR-166116] N83-25377
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432
Natural convection in an enclosed cavity
[NASA-CR-166112] N83-25433
Theoretical method for calculating relative joint geometry of assembled robot arms
[NASA-TP-2155] N83-25438
Nucleon and deuteron scattering cross sections from 25 MV/Nucleon to 22.5 GeV/Nucleon
[NASA-TM-84636] N83-25525
Miniature electro-optical air flow sensor
[NASA-CASE-LAR-13065-1] N83-25539
Rotary target v-block
[NASA-CASE-LAR-12007-3] N83-25542
Langley test highlights, 1982
[NASA-TM-84655] N83-25650

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.

Efficient solution of the Euler and Navier-Stokes equations with a vectorized multiple-grid algorithm
[NASA-TM-83376] N83-24467
End-wall boundary layer measurements in a two-stage fan
[NASA-TM-83409] N83-24470
Experimental comparison of icing cloud instruments
[NASA-TM-83340] N83-24487
Effects of interstage diffuser flow distortion on the performance of a 15.41-centimeter tip diameter axial power turbine
[NASA-TM-83359] N83-24505
Opportunities for research in aerothermodynamics
[NASA-TM-83348] N83-24506
Particle sizing by measurement of forward-scattered light at two angles
[NASA-TP-2156] N83-24509
Design considerations for large space electric power systems
[NASA-TM-83064] N83-24552
Design procedures for fiber composite structural components: Rods, columns and beam columns
[NASA-TM-83321] N83-24559
Pore size engineering applied to the design of separators for nickel-hydrogen cells and batteries
[NASA-TM-83386] N83-24571
Experimental design of an interlaboratory study for trace metal analysis of liquid fluids
[NASA-TP-2148] N83-24575
A comprehensive analysis of cavitation and liquid impingement erosion data
[NASA-TM-83352] N83-24634
Tribological and microstructural characteristics of ion-nitrided steels
[NASA-TM-83368] N83-24635
Effect of oxygen concentration in ZDP containing oils on surface composition and wear
[NASA-TM-83000] N83-24636
Time effect of erosion by solid particle impingement on ductile materials
[NASA-TM-83369] N83-24637
The effects of Ni, Mo, Ti and Si on the mechanical properties of Cr free Mn steel (Fe-25Mn-5Al-2C)
[NASA-TM-83355] N83-24638
Improved nickel base coating alloy
[NASA-CASE-LEW-13834-1] N83-24639
Nitriding of titanium and titanium: 8 percent aluminum, 1 percent molybdenum, 1 percent vanadium alloy with an ion-beam source
[NASA-TP-2149] N83-24640
Morphology of an aluminum alloy eroded by a jet of angular particles impinging at normal incidence
[NASA-TP-2139] N83-24641
Solid spherical glass particle impingement studies of plastic materials
[NASA-TP-2161] N83-24695
Advanced electrical power system technology for the all electric aircraft
[NASA-TM-83390] N83-24764
A refrigerated dynamic seal
[NASA-TM-83378] N83-24798
The effect of annealing on the creep of plasma sprayed ceramics
[NASA-TM-83396] N83-24799
Analysis of strain gage reliability in F-100 jet engine testing at NASA Lewis Research Center N83-24829
Optimum parallel step-sector bearing lubricated with an incompressible fluid
[NASA-TM-83356] N83-24855
Cavitation erosion of copper, brass, aluminum and titanium alloys in mineral oil
[NASA-TM-83402] N83-24856
NASA transmission research and its probable effects on helicopter transmission design
[NASA-TM-83389] N83-24858
Regression analysis of traction characteristics of traction fluids
[NASA-TP-2154] N83-24862
Stress intensity and displacement coefficients for radially cracked ring segments subject to three-point bending
[NASA-TM-83059] N83-24874
Vapor cavitation in dynamically loaded journal bearings
[NASA-TM-83366] N83-24875
Testing and performance characteristics of a 1-kW free piston Stirling engine
[NASA-TM-82999] N83-25036
IGCC performance comparison for variations in gasifier type and gas turbine firing temperature
[NASA-TM-83310] N83-25037
Cycle life test and failure model of nickel-hydrogen cells
[NASA-TM-83375] N83-25038

DOE and AID stand-alone photovoltaic activities
[NASA-TM-83374] N83-25041
Single cell performance studies on the Fe/Cr Redox Energy Storage System using mixed reactant solutions at elevated temperature
[NASA-TM-83385] N83-25042
Solar cell measurements N83-25109
Acoustical modal analysis of the pressure field in the tailpipe of a turbofan engine
[NASA-TM-83387] N83-25499
Free-piston Stirling hydraulic engine and drive system for automobiles
[NASA-TM-82992] N83-25625

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
STS-2, -3, -4 Induced Environment Contamination Monitor (ICEM)
[NASA-TM-82524] N83-24539
Perfect bell nozzle parametric and optimization curves
[NASA-RP-1104] N83-24549
Analysis of Full-Test tools and their limitations as applied to terminal junction blocks
[NASA-TM-82520] N83-24553
Coupling an induction motor type generator to a-c power lines
[NASA-CASE-MFS-25302-2] N83-24768
Gas levitator having fixed levitation node for containerless processing
[NASA-CASE-MFS-25509-1] N83-24828
Liquid helium management for Gravity Probe-B
[NASA-TM-82521] N83-24830
Latch fittings for the scientific instruments on the space telescope N83-24898
The evolution fo a release-engage mechanism for use on the orbiter N83-24905
Summary Proceedings of a Wind Shear Workshop
[NASA-CP-2270] N83-25265
Significant events in low-level flow conditions hazardous to aircraft
[NASA-TM-82522] N83-25268
The Pinhole/Occulter Facility
[NASA-TP-2168] N83-25646

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
Stabilized lanthanum sulphur compounds
[NASA-CASE-NPO-16135-1] N83-24572
Split-cross-bridge-resistor for testing for proper fabrication of integrated circuit
[NASA-CASE-NPO-16021-1] N83-24769
Digital control of diode laser for atmospheric spectroscopy
[NASA-CASE-NPO-16000-1] N83-24842
Mobile sampler for use in acquiring samples of terrestrial atmospheric gases
[NASA-CASE-NPO-15220-1] N83-25217
System and method for moving a probe to follow movements of tissue
[NASA-CASE-NPO-15197-1] N83-25346
Method for making a bonded single mode fiber optic wavelength coupler
[NASA-CASE-NPO-15464-1] N83-25540
Optical system
[NASA-CASE-NPO-15801-1] N83-25541
Photoelectrochemical electrodes
[NASA-CASE-NPO-15458-1] N83-25587

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. WALLOPS FLIGHT CENTER, WALLOPS ISLAND, VA.
Rain rate measurement capabilities using a Seasat type radar altimeter N83-25311

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
PEANUTS - the PETW data system
[MAW-82-009-U] N83-24519
Development of a non-insulated cryogenic strain-gauge balance
[M-TP-82-006-U] N83-24520

NATIONAL AEROSPACE LAB., TOKYO (JAPAN).
An approximate method of estimating the aerodynamic interference between 2 parallel bodies in a supersonic flow (axial force)
[NAL-TR-751] N83-24475
An approximate analysis for flat nosed body in supersonic flow (without attack angle)
[NAL-TR-747] N83-24476
Calculation of unsteady transonic potential flow over 3-dimensional wings with oscillating control surfaces
[NAL-TR-746] N83-24477
Research and development of the turbofan engine (the 2nd phase, FJR 710)
[NAL-TR-741] N83-24508
Real time digital intergration and integral step size for flight control and flight simulation
[NAL-TR-743] N83-24514
Effects of small thrust on the motion of an artificial Earth satellite
[NAL-TR-744] N83-24533
Atmospheric drag effects on the motion of an artificial Earth satellite
[NAL-TR-748] N83-24534
An experimental and analytical study of spray flow fields formed by liquid-gas coaxial injector elements (2)
[NAL-54-745] N83-24807
Development of the charge amplifier for piezoelectric accelerometer sensors
[NAL-TR-749] N83-24832
Seal performance and durability of rotating shaft seals of liquid oxygen turbopump
[NAL-TR-717] N83-24860
Study on sealing characteristics of high speed, face-contact bellows mechanical seals for liquid hydrogen
[NAL-TR-750] N83-24861

NATIONAL BUREAU OF STANDARDS, BOULDER, COLO.
Transport properties of oxygen
[NASA-RP-1102] N83-24800

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Energy-release rate associated with diffusional crack growth
[DE83-005564] N83-24915
An approved laboratory program for photovoltaic reference cell development N83-25107

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH, BOULDER, COLO.
Needs, opportunities and strategies for a long-term oceanic sciences satellite program
[NASA-CR-170275] N83-25339

NATIONAL MATERIALS ADVISORY BOARD, WASHINGTON, D. C.
Effective use of weld metal yield strength for HY-steels
[AD-A124234] N83-24642

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Accuracy of pyranometer calibrations and pyranometer characterization N83-25102
A standard verification for rainfall estimation from remote platforms N83-25288
The estimation of convective precipitation from GOES imagery with the Griffith/Woodley technique N83-25296

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Visible and infrared techniques for flash flood, hydrological, and agricultural applications N83-25295

NATIONAL SEVERE STORMS LAB., NORMAN, OKLA.
A survey of radar rain measurement techniques N83-25290

NATIONAL SPACE DEVELOPMENT AGENCY, IBARAKI (JAPAN).
Evaluation of scanning earth sensor mechanism on engineering test satellite 4 N83-24890

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
Hydrologic forecasting requirements for precipitation data from space measurements N83-25280

NATURAL POWER, INC., NEW BOSTON, N.H.
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151

NAVAL ACADEMY, ANNAPOLIS, MD.
Capacitive pressure transducers and pressure fixed points
[AD-A124254] N83-24836
Performance optimization of a pneumatic wave energy conversion device
[AD-A124295] N83-25114

NAVAL AIR ENGINEERING CENTER, LAKEHURST, N.J.
Capacity selector value electronics enclosure assembly controller card assembly test specifications
[AD-A123539] N83-24772
Wear debris analysis of grease-lubricated spur gear
[AD-A123405] N83-24864

NAVAL CIVIL ENGINEERING LAB., PORT HUENEME, CALIF.
Improved field performance for reverse osmosis systems
[AD-A124244] N83-24579
Test and Evaluation of the Magnograph (TM) unit, a nondestructive wire rope tester
[AD-A124267] N83-24835
A model for on-offshore sediment transport in the surfzone
[AD-A124235] N83-25340

NAVAL COASTAL SYSTEMS LAB., PANAMA CITY, FLA.
Reverberation research overview
[AD-A123351] N83-25501

NAVAL FACILITIES ENGINEERING COMMAND, ALEXANDRIA, VA.
Petroleum fuel facilities. Design Manual 22
[AD-A123584] N83-24714

NAVAL HEALTH RESEARCH CENTER, SAN DIEGO, CALIF.
Salivary and plasma testosterone and cortisol during moderately heavy excercise
[AD-A122107] N83-25352
L-tryptophan: Effects on daytime sleep latency and the waking EEG
[AD-A123633] N83-25354
Sleep spindle and delta changes during chronic use of a short-acting and a long-acting benzodiazepine hypnotic
[AD-A123149] N83-25360

NAVAL MEDICAL RESEARCH INST., BETHESDA, MD.
Data acquisition and analysis software for thermal stress studies
[AD-A122567] N83-25361
Computer-assisted system for determination of O2 consumption and Co2 production in man
[AD-A122525] N83-25362
Calibrator for an electromagnetically braked bicycle ergometer
[AD-A122511] N83-25363

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Evaluating J sub N(z) via series representation
[AD-A124690] N83-25460

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Marine atmospheric boundary layer modeling for tactical use
[AD-A123317] N83-25246
Pilot selection criteria for the AH-64 helicopter
[AD-A122495] N83-25371
A game theory approach to search
[AD-A124631] N83-25486

NAVAL RESEARCH LAB., WASHINGTON, D. C.
Preparation of ESR alloy HT-9 and modified 9Cr-1Mo alloy for UBR irradiation experiments N83-24667
Large-scale pressurizable fire test facility, Fire 1
[AD-A124288] N83-24730
Improvement of the narrowband linear predictive coder. Part 1: Analysis improvements
[AD-A124313] N83-24758
Design of electron-beam controlled switches
[AD-A124312] N83-24785
Stability characteristics for flows of the vortex sheet type
[AD-A123344] N83-24815
Nonuniformities in laser-ablated plasma
[AD-A123643] N83-24844
Interface specifications for the SCR (A-7E) extended computer module
[AD-A123566] N83-25411
Energy scaling laws for the racetrack induction accelerator
[AD-A123659] N83-25507
Saturation of the lower-hybrid-drift instability by mode coupling
[AD-A123569] N83-25564
Electronic structure of substoichiometric titanium-iron hydride
[DE82-020183] N83-25602
The solar radiation field at twilight below 100 KM: A spherical model
[AD-A122832] N83-25648

NAVAL SURFACE WEAPONS CENTER, DAHLGREN, VA.
Long baseline (transoceanic) surveying using the global positioning system and its broadcast ephemeris
[AD-A123585] N83-24497
What is a Software Engineering Environment (SEE)? Desired characteristics
[AD-A124280] N83-25396

NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
Dynamic behavior of particulate viscoelastic composites for sound absorption
[AD-A124272] N83-25502

NAVAL UNDERWATER SYSTEMS CENTER, NEWPORT, R.I.
Theoretical considerations and user's manual for a modified XYZ potential flow program for calculating five degrees-of-freedom velocity potentials
[AD-A123372] N83-25403

NEW MEXICO STATE UNIV., LAS CRUCES.
Data report for the Southwest Residential Experiment Station, December 1981
[DOE/ET-20279/184] N83-25054

NEW MEXICO UNIV., ALBUQUERQUE.
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-170333] N83-25039

Performance of labyrinth-stratified water-storage system for heating and cooling
[DE82-020817] N83-25163

NEW TECHNOLOGY, INC., HUNTSVILLE, ALA.
Conceptual design of a data reduction system
[NASA-CR-170757] N83-25379

NEW YORK UNIV. MEDICAL CENTER.
Intracortical interactions for orientation contrast
[AD-A123326] N83-25353

NEWCOMB AND BOYD, ATLANTA, GA.
Standardized EMCS energy savings calculations
[AD-A123383] N83-24731

NORGES TEKNISKE HOEGSKOLE, TRONDHEIM.
Thermal conductivity of molten alkali nitrates N83-25084

NORTH CAROLINA AGRICULTURAL AND TECHNICAL STATE UNIV., GREENSBORO.
Guidance and control of MIR TDL radiation via flexible hollow metallic rectangular pipes and fibers for possible LHS and other optical system . compaction and integration
[NASA-CR-170344] N83-25538
Material growth and characterization for solid state devices
[NASA-CR-170342] N83-25586

NORTH CAROLINA STATE UNIV., RALEIGH.
Evaluation of olivine refractories for TES N83-25070

NORTH CAROLINA UNIV., CHAPEL HILL.
Generating parallel correlated transition frequencies for a Markov chain
[AD-A124250] N83-25478
Variance reduction in the simulation of stochastic activity networks
[AD-A124251] N83-25479
Superefficient simulation of Markov chains and semi-Markov processes
[AD-A124252] N83-25480
Inner shells as a link between atomic and nuclear physics
[DE83-004560] N83-25523

NORTH DAKOTA UNIV., GRAND FORKS.
Dickinson geothermal study
[DE82-016945] N83-25018
Evaluation of hydrothermal resources of North Dakota, phase 3
[DE83-004641] N83-25023

NORTHEASTERN UNIV., BOSTON, MASS.
Characterization of mechanical, thermal and wear properties of titanium rich metallic glasses
[AD-A123595] N83-24700
A VAX assembler for the Intel 8748 microcomputer
[AD-A123378] N83-25404

NORTHROP NORTRONICS, PALOS VERDES PENINSULA, CALIF.
Efficient KrF-laser pulse compression
[DE82-021926] N83-24848

NORTHROP RESEARCH AND TECHNOLOGY CENTER, PALOS VERDES PENINSULA, CALIF.
Efficient Raman conversion of XeCl laser into the blue-green region
[AD-A124193] N83-24843

NORTHWESTERN UNIV., EVANSTON, ILL.
Synthesis and properties of elevated temperature P/M aluminum alloys
[AD-A123224] N83-24645

O

OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
Noble-gas removal and concentration by combining fluorocarbon absorption and adsorption technologies
[DE82-019469] N83-24593
Hydrogeochemical and stream-sediment reconnaissance basic data for Boise Quadrangle, Oregon; Idaho
[DE83-004483] N83-25022

OAK RIDGE NATIONAL LAB., TENN.
Ceramic-metal solid electrolytes
[DE82-009034] N83-24591
Evaluation of coking behavior in coal-liquefaction-process equipment
[DE82-020831] N83-24606
Desalting seawater and brackish waters: 1981 cost update
[DE82-020482] N83-24629
Alloy development for irradiation performance
[DE83-006357] N83-24648
Operation of the ORR spectral tailoring experiments ORR-MFE-4A and ORR-MFE-4B N83-24650
Neutronics calculations in support of the ORR-MFE-4 spectral tailoring experiments N83-24652
Irradiation creep in path A alloys irradiated to 5 dpa in the ORR-MFE-4A spectral tailoring experiment N83-24653
Swelling and microstructural development in path A PCA and type 316 stainless steel irradiated in HFIR to about 22 dpa N83-24654
The tensile properties of unirradiated path A PCA N83-24655
Tensile properties and swelling of 20 percent-cold-worked type 316 stainless steel irradiated in HFIR N83-24656
Microstructural development of 20 percent-cold-worked type 316 stainless steel irradiated in ORR at 250 to 500 deg C N83-24657
Microstructure of welds in an iron-base long-range-ordered alloy N83-24660
Status of scale-up of an iron-base long-range-ordered alloy N83-24661
Fractographic examination of HT-9 and 9Cr-1Mo charpy specimens irradiated in the AD-2 test N83-24663
Irradiation experiment status and schedule N83-24669
Fusion program research materials inventory N83-24670
Corrosion of path A PCA, type 316 stainless steel and Fe-12 Cr-1 MoVW steel in flowing lithium N83-24671
Corrosion of ferrous alloys in static Pb and Pb-17 at. % Li N83-24673
Application of quantitative EELS to analysis of the titanium-carbide phase in austenitic stainless steels
[DE82-020931] N83-24681
Testing and validation of the Purdue Physical Properties Package (PPROP) Code
[DE82-007727] N83-24724
Some aspects of the computer simulation of conduction heat transfer and phase change processes
[ORNL/CSD-100] N83-24801
Simultaneous heat and mass transfer in absorption of gases in laminar liquid films
[DE82-021108] N83-24821
Evaluation of a heat exchanger for use in the Integrated Equipment Test facility solvent-extraction system
[DE83-005174] N83-24823
Laboratory evaluation of the heating capacity and efficiency of a high-efficiency, air-to-air heat pump with emphasis on frosting/defrosting operation
[DE83-005168] N83-24827
Temperature standards, what and where: Resources for effective temperature measurements
[DE82-009619] N83-24838
Thermal stress analysis of an aluminum-mylar transformer coil
[DE82-007728] N83-24912
Agricultural production in the US by county: A compilation of information from the 1974 census of agriculture for use in terrestrial food-chain transport and assessment models
[DE82-006143] N83-25013
Chattanooga shale: An assessment of the resource and technology for recovery of hydrocarbons and minerals
[DE82-012372] N83-25021
Mathematical modeling of TES subsystems N83-25079
Assessment of materials and components performance in Bi-Gas, Westinghouse and Combustion Engineering gasification pilot plants
[DE82-020457] N83-25140
Earth thermal storage for enhanced performance of air-to-air heat pumps
[DE83-020773] N83-25156
Earth thermal-storage-assisted heat pump
[DE82-020823] N83-25157
Heat-pump cool storage in a clathrate of freon
[DE82-020840] N83-25158
Basic chemical studies related to low-temperature thermal-energy storage. Task 1: Thermo-dynamic properties and interactions of salt hydrates used as phase-change materials
[DE82-020826] N83-25162
Oak Ridge National Laboratory Thermal-Energy-Storage Program overview
[DE82-020818] N83-25164
A comparison of laboratory and field-test measurements of heat-pump water heaters
[DE82-020810] N83-25165
Environmental Sciences Division report
[ORNL-5900] N83-25218
Validation of the atmospheric transport model: Comparison of observed krypton-85 concentrations with those computed using a Gaussian plume model
[DE82-018163] N83-25260
Tracer theory with applications in geosciences, publication 1964
[DE83-004174] N83-25264
Biological effects of static magnetic fields: A selective review with emphasis on risk assessment
[DE82-013350] N83-25367

Oak Ridge National Laboratory filtering and smoothing programs
[ORNL/CSD/TM-168] N83-25386
Text string plotting enhancements for the Tektronix advanced graphing 2 software on the ORNL Fusion Energy Division decsystem-10
[ORNL/TM-8026] N83-25387
Simulation analysis of some outlier detection methods
[ORNL/CSO/TM-143] N83-25434
A mushy zone model with an exact solution
[ORNL/CSD-91] N83-25435
A method for interpolating in Bondarenko factor tables and other functions
[DE82-015685] N83-25470
Using the method-of-lines technique to solve initial-boundary-value partial differential equations
[DE82-020909] N83-25472
LU decompositions of generalized diagonally dominant matrices
[ORNL/CSD-98] N83-25491
Elastic scattering and inelastic scattering of 79.5 MeV 11B and 87.5 MeV 10B
[DE82-007791] N83-25508
Negative-ion states
[DE82-020832] N83-25517
Production and reactions of negative ions
[DE82-020824] N83-25520
Effects of low-energy-electron-capture collisions (H0 + c/sup n+) on the particle and energy balance of Tokamak plasmas
[DE82-018263] N83-25524
Optical constants for silicon at 300K and 10K determined from 1.64 to 4.73 eV by ellipsometry
[DE82-010062] N83-25558
Long-wave ion-cyclotron turbulence of plasma with transverse flow
[DE83-002597] N83-25566
Electron-confinement studies on EBT-S using soft-X-ray techniques
[DE82-020477] N83-25571
Status of FED/INTOR electromagnetics
[DE83-005976] N83-25585
Reducing the size of a data base by using pattern-recognition techniques
[DE82-017388] N83-25618

OAK RIDGE Y-12 PLANT, TENN.
Cutting-fluid conservation
[Y-2250] N83-24728
Cutting-fluid conservation
[DE82-009655] N83-24734
Flywheel testing and evaluation
[DE82-020894] N83-25160

OGDEN AIR LOGISTICS CENTER, HILL AFB, UTAH.
Propellant surveillance report LGM-30 F & G stage 1, phase G, series I, TP-H1011
[AD-A123315] N83-24713

OHIO STATE UNIV., COLUMBUS.
Program WINDOW
[DE82-020760] N83-24611
Fabrication and evaluation of gas-chromatographic systems of high efficiency with concomitant high selectivity
[DE82-020758] N83-24612
Novel mesogenic polysiloxane solvents for gas-liquid chromatography
[DE82-020753] N83-24613
The effect of random steering vector errors in the Applebaum adaptive array
[AD-A124282] N83-24743
Electrically small antennas
[AD-A124364] N83-24744
Advances and trends in plate buckling research
[AD-A123358] N83-24909
The indirect effects on the computation of geoid undulations
[NASA-CR-170347] N83-25006
The differential reflectivity dual polarization method of rainfall measurements N83-25289
A FORTRAN program for the computation of gravimetric quantities from high degree spherical harmonic expansions
[AD-A123406] N83-25413
Gravity parameter estimation from large data sets using stabilized integral formulas and a numerical integration based on discrete point data
[AD-A123397] N83-25469

OKLAHOMA STATE UNIV., STILLWATER.
Microbial ecology of extreme environments: Antarctic dry valley yeasts and growth in substrate-limited habitats
[NASA-CR-170332] N83-25343

OLD DOMINION UNIV., NORFOLK, VA.
On parameter identification for large space structures
[NASA-CR-170306] N83-24543
Impact damage of composite plates
[NASA-CR-170309] N83-24558

Higher modes of the Orr-Sommerfeld problem for boundary layer flows
[NASA-CR-170343] N83-24797
Tropic interactions of the sea nettle, Chrysaora quinquecirrha
[TR-82-2] N83-25338
OREGON STATE UNIV., CORVALLIS.
Increase of total CO sub 2 in the world oceans
[DE83-004868] N83-25235
OREGON UNIV., EUGENE.
Laser spectroscopy of combustion intermediates
[DE83-004869] N83-24590

P

PACIFIC MISSILE TEST CENTER, POINT MUGU, CALIF.
Guidelines for correction of radiosonde-derived refractive profiles and climatologies
[AD-A124351] N83-25322
Air mass trajectories and atmospheric radon measurements during the EOMET/OSP experiments on San Nicolas Island (1978 - 1980)
[AD-A123517] N83-25323
PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Chemical characterization and genotoxic potential related to boiling point for fractionally distilled SRC-1 coal liquids
[DE82-019722] N83-24821
Krypton-85 storage in sputter-deposited amorphous metals
[DE82-019206] N83-24678
Near-surface crack detection in nuclear pressure vessels
[DE82-019184] N83-24871
LANDSAT-4 image data quality analysis for energy related applications
[E83-10295] N83-24998
Spectral response measurements for solar cells N83-25110
US Department of Energy wind turbine candidate site program: The regulatory process
[DE82-018444] N83-25153
Wet storage of spent fuel
[DE82-014846] N83-25527
Waste glasses-requirements and characteristics
[DE82-014855] N83-25528
A decision making model for the recovery of useful material resources from wastes
[DE82-019204] N83-25620
PACIFIC-SIERRA RESEARCH CORP., LOS ANGELES, CALIF.
ULF near fields in layered media
[AD-A123669] N83-24747
PAILEN-JOHNSON ASSOCIATES, INC., MCLEAN, VA.
Failure Modes, Effects and Criticality Analysis (FMECA) of type AN/GRN-27 (V) instrument landing system with traveling-wave localizer antenna
[DOT/FAA/PM-83/18] N83-24492
PARIS-SUD UNIV., ORSAY (FRANCE).
A study of the thermal and suprathermal fluctuations of the electron density of the plasma in the FOCUS experiment
[CEA-R-5153] N83-25562
PEDCO-ENVIRONMENTAL, INC., CINCINNATI, OHIO.
Acid rain: Commentary on controversial issues and observations on the role of fuel burning
[DE82-016914] N83-25219
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Dynamics, energetics, and structure of microclusters: Elucidating the physical basis for catalysis and surface chemistry, reactions in condensed phases, and aerosol-particle formation
[DE83-003804] N83-24617
The structure of evaporating and combusting sprays: Measurements and predictions
[NASA-CR-170312] N83-24795
Interactive initialization of heat flux parameters for numerical models using satellite temperature measurements
[E83-10293] N83-24996
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017041] N83-25179
The characteristics of American coals in relation to their conversion into clean-energy fuels
[DE82-017040] N83-25180
Global weather requirements for precipitation measurements N83-25262
Physical adsorption: Rare-gas atoms on solid surfaces
[DE83-000241] N83-25519
PENNSYLVANIA TRANSPORTATION INST., UNIVERSITY PARK.
The characteristics of American coals in relation to their conversion into clean-energy fuels, appendix B
[DE82-017047] N83-25181
PENNWALT CORP., KING OF PRUSSIA, PA.
Pelletization and roll encapsulation of phase change materials N83-25074
PERFORMANCE MEASUREMENT ASSOCIATES, INC., VIENNA, VA.
Accuracy and completeness of problem solutions with example-solutions
[AD-A124087] N83-25463
PERKIN-ELMER CORP., DANBURY, CONN.
Lightweight Zerodur mirror technology
[AD-A123538] N83-25555
PERKIN-ELMER CORP., NORWALK, CONN.
AXAF technology mirror assembly. AXAF/TMA parabola and hyperbola generating report
[NASA-CR-170742] N83-25537
PHYSICAL SCIENCES, INC., ANDOVER, MASS.
Effects of preignition on pulverized-coal combustion
[DE82-020517] N83-24599
PINSON ENERGY CORP., MARSTON MILLS, MASS.
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151
PITTSBURGH AND MIDWAY COAL MINING CO., SHAWNEE MISSION, KANS.
Liquefaction of bituminous coals with added catalysts
[DE83-000309] N83-24600
PITTSBURGH UNIV.,
Simulation systems for cognitive psychology
[AD-A123394] N83-25369
Forms of understanding in mathematical problem solving
[AD-A123384] N83-25454
Continuous multistate structure functions
[AD-A123444] N83-25466
PLANNING RESEARCH CORP., KENNEDY SPACE CENTER, FLA.
Rolling beam umbilical system N83-24900
POLYTECHNIC INST. OF NEW YORK, FARMINGDALE.
Quasi-optic studies of dielectric radomes and lenses
[AD-A124371] N83-24761
PRATT AND WHITNEY AIRCRAFT GROUP, WEST PALM BEACH, FLA.
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
PRINCETON UNIV., N. J.
Fuels combustion research
[AD-A123118] N83-24588
Alternatives to optimal detection
[AD-A123454] N83-24760
Asymptotic spectral analysis of cross-product matrices
[AD-A123438] N83-25465
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
PUBLIC SERVICE CO. OF COLORADO, PUEBLO.
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
PUBLIC SERVICE CO. OF INDIANA, PLAINFIELD.
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201
PURDUE UNIV., LAFAYETTE, IND.
Agricultural requirements for precipitation measurements N83-25279

Q

QUEENSLAND UNIV., BRISBANE (AUSTRALIA).
Some predictions of the non-homogeneous behaviour of clay in the triaxial test
[RR-CE-26] N83-24729
Shape effects on resistance to flow in smooth semi-circular channels
[RR-CE-18] N83-24802
An experimental study of blockage effects on some bluff profiles
[RR-CE-23] N83-24803
Effects of laminar boundary layer on a model broad-crested weir
[RR-CE-28] N83-24804
The design of single angle struts
[RR-CE-19] N83-24877
Consolidation of axi-symmetric bodies subjected to non axi-symmetric loading
[RR-CE-20] N83-24879
The finite integral method in dynamic analysis: A reappraisal
[RR-CE-27] N83-25436
QUEENSLAND UNIV., ST. LUCIA (AUSTRALIA).
Critical assessment of the international estimates for relaxation losses in prestressing strands
[RR-CE-25] N83-24878

R

RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Kwajalein Missile Range, Kwajalein, Marshall Islands range reference atmosphere 0-70 Km altitude
[AD-A123424] N83-25255
RANN, INC., PALO ALTO, CALIF.
Some exploratory considerations of scale effects on the potential performance of wood energy conversion systems
[DE83-001378] N83-25122
RAYTHEON CO., BEDFORD, MASS.
Power conditioning subsystem design
[AD-A124191] N83-25113
REINKE (RALPH G.), WAUSAU, WIS.
Distilling alcohol with waste automobile heat
[DE82-018727] N83-24716
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
Lubricant foaming and aeration study
[AD-A124184] N83-24696
Numerical methods for stiff systems of two-point boundary value problems
[NASA-CR-166115] N83-25432
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
RHODE ISLAND UNIV., KINGSTON.
Estimating the parameters of exponentially damped or undamped sinusoidal signals in noise
[AD-A123177] N83-24750
RISO NATIONAL LAB., ROSKILDE (DENMARK).
Synchrotron X-ray study of physisorbed films of mixtures of Ar and Xe on graphite
[DE82-019349] N83-25605
ROCHESTER UNIV., N. Y.
VLSI implementation of odd-even sorter using a uniform ladder
[TR-85] N83-24767
On shapes
[TR-92] N83-25388
ROCKET RESEARCH CORP., REDMOND, WASH.
Application of thermal energy storage to process heat recovery. Phase 3: Heat exchanger evaluation N83-25080
ROCKWELL INTERNATIONAL CORP., ANAHEIM, CALIF.
Epitaxial hexagonal ferrites for millimeter wave tunable filters
[AD-A123589] N83-25596
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Process for practically complete removal of hydrogen sulfide from low-pressure gases
[DE83-005022] N83-24631
Remote calibration of torque wrenches in a hostile environment
[RFP-3298] N83-24831
An automatic temperature-calibration system
[DE82-021953] N83-24840
ASI/Pinson 1-kilowatt high-reliability wind-system development. Phase 1: Design and analysis
[DE82-015600] N83-25151
ROME AIR DEVELOPMENT CENTER, GRIFFISS AFB, N.Y.
Statistical analysis of the effect of phase quantization on array antenna sidelobes
[AD-A123704] N83-24748
Fiber optic transceiver thermal analysis
[AD-A123532] N83-25548

S

SAAB-SPACE A.B., LINKOEPING (SWEDEN).
Deployment and release mechanisms on the Swedish satellite, VIKING N83-24901
SAN DIEGO STATE UNIV., CALIF.
Ground truth for oceanic rainfall N83-25291
SANDIA LABS., ALBUQUERQUE, N. MEX.
An experimental and theoretical investigation of the reduction in parachute drag caused by forebody wake effects: Data compilation and program summary
[DE83-005364] N83-24486

CHEMSEN: A computer code for sensitivity analysis of elementary chemical reaction models
[DE82-020886] N83-24557
Characterization of a procedure for preparing 6061 aluminum alloy for barrier anodization
[DE83-005383] N83-24693
Large scale hydrogen-air detonations
[DE82-020353] N83-24722
Validation diagnostics for defective thermocouple circuits
[DE82-012778] N83-24787
COYOTE: A finite-element computer program for nonlinear heat-conduction problems
[DE83-003822] N83-24820
Experimental and numerical studies of natural convection in a Hele-Shaw cell
[DE83-005251] N83-24824
The Sandia nuclear microprobe
[DE83-005363] N83-24839
Design of a diesel exhaust-gas purification system for inert-gas drilling
[DE82-017071] N83-24866
A random vibration control system for testing a single test item with multiple inputs
[DE82-018973] N83-24916
Case history of tantalum-weld cracking
[DE82-020358] N83-24917
Single media thermocline TES studies at Sandia National Laboratories
[SAND-81-1868C] N83-25088
Thermomechanical cavity-growth modeling
[DE82-020356] N83-25139
Results of solar testing of circular foil heat-flux sensors at the White Sands solar furnace
[DE82-006282] N83-25142
Geothermal completion technology life-cycle cost model (GEOCOM)
[DE82-016787] N83-25146
Shenandoah Solar Total-Energy Project
[DE83-005244] N83-25168
Development of a solar-flux tracker for parabolic-trough collectors
[DE83-005361] N83-25171
Intermediate photovoltaic system application experiment operational performance report. Volume 8: For Lovington Square Shopping Center, Lovington, New Mexico
[DE82-012060] N83-25189
Dynamic behavior of a class of photovoltaic converters
[DE82-019344] N83-25190
Department of Energy Solar-Central-Receiver Annual Meeting
[DE82-011932] N83-25192
Review of polymer usage in the development of prototype troughs by Sandia National Laboratories, Albuquerque (SNLA)
[DE82-001912] N83-25193
Advanced concentrator cell research at Sandia National Laboratories
[DE82-005772] N83-25194
Intermediate photovoltaic system application experiment operational performance report. Volume 14: For Lovington Square Shopping Center, Lovington, New Mexico, July and August 1982
[DE83-005381] N83-25202
Modular Airborne Remote Sampling and Sensing System (MARSSS)
[DE82-005691] N83-25226
Some remarks on the Herlestam-Johannesson algorithm for computing logarithms over GF(2P)
[DE82-020628] N83-25423
A system for developing HP41CV hand-held calculator programs on an HP9845 desktop computer
[DE83-005360] N83-25426
the effect of changing step size on the accuracy of multistep formulas
[DE82-020884] N83-25474
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
A comparison of quartz crystals grown from fused silica and from crystalline nutrient
[DE82-019487] N83-25603
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604
The information data bases at the Transportation Technology Center
[DE82-011468] N83-25626

SANDIA LABS., LIVERMORE, CALIF.

The effect of melt practice (ESR vs. AOD) on the toughness of HT-9 laser welds N83-24665
The effect of quench rate and refrigeration on the mechanical properties of ESR processed HT-9 N83-24666
Centerline cracking in electron-beam cap-to-header welds in type 304L stainless steel
[DE82-020858] N83-24689
Use of ultrasonic signal analysis in the detection of deformation-induced cavitation
[DE83-005902] N83-24919
Floppy-disk system for punched-tape reader emulation
[DE82-021126] N83-25385

SARGENT AND LUNDY, ENGINEERS, CHICAGO, ILL.

Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 7: Environmental, safety and licensing considerations
[DE83-005728] N83-25050
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 6: Balance of plant design
[DE83-005729] N83-25200
Compressed-air energy-storage preliminary design and site-development program in an aquifer. Volume 9: Cost estimate and schedule
[DE83-005727] N83-25201

SCHAEFFER MAGNETICS, INC., CHATSWORTH, CALIF.

A broadbased actuator concept for spaceflight application N83-24885

SCHOOL OF AEROSPACE MEDICINE, BROOKS AFB, TEX.

Ocular thermal injury from intense light
[AD-A122226] N83-25366

SCIENCE APPLICATIONS, INC., BOULDER, COLO.

Mirror stability of a hot-electron ring plasma
[DE82-022155] N83-25569

SCIENCE APPLICATIONS, INC., PALO ALTO, CALIF.

PLUNGE: A computer program for transient-event analysis
[DE82-902098] N83-25419

SCIENCE APPLICATIONS, INC., WAYNE, PA.

Maneuvering Aerothermal Technology (MAT) program. A method for coupled three-dimensional inviscid and integral boundary layer calculations
[AD-A123468] N83-24814

SCIENTIFIC RESEARCH ASSOCIATES, INC., GLASTONBURY, CONN.

Noise and thermal contributions in transferred electron two and three terminal devices
[AD-A124326] N83-24756

SCRIPPS INSTITUTION OF OCEANOGRAPHY, LA JOLLA, CALIF.

Using underwater ambient noise levels to measure rainfall rate: A review N83-25302

SES, INC., NEWARK, DEL.

Summary of solar irradiance data sessions N83-25100
Development of a standard test method for measuring photovoltaic cell performance. A status report N83-25111

SMITHSONIAN ASTROPHYSICAL OBSERVATORY, CAMBRIDGE, MASS.

Satellite-tracking and Earth dynamics research programs
[NASA-CR-170341] N83-24920
Study of the time evolution of the lithosphere
[NASA-CR-170337] N83-25238
Feasibility study of an optically coherent telescope array in space
[NASA-CR-170758] N83-25545

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, LES MUREAUX (FRANCE).

The return of the propeller airplane
[SNIAS-822-111-102] N83-24501

SOLAR ECONOMICS, INC., DALLAS, TEX.

Economic and financial analysis of residential photovoltaic systems. The impact of solar photovoltaics on utilities
[DOE/ET-20279/185] N83-25052

SOLAR POWER CORP., WOBURN, MASS.

Source for reference cells N83-25106

SOUTHERN CALIFORNIA GAS CO., LOS ANGELES.

Metal hydride/chemical heat pump development project N83-25068

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.

Simulated blast testing of advance interceptor materials
[AD-A124374] N83-24563
Crack tip plasticity associated with corrosion assisted fatigue
[AD-A123391] N83-24647
Cottonseed oil as a diesel-engine fuel, part 1
[DE83-900881] N83-24725
Cottonseed oil as a diesel-engine fuel. Part 2: Appendices
[DE83-900880] N83-24726
Nondestructive testing of large steam-turbine rotors
[DE83-901108] N83-24870
Reliability of steam-turbine rotors. Task 1: Lifetime prediction analysis system
[DE83-901096] N83-24873
Steam-turbine-disc cracking experience. Volume 2: Data summaries and discussion
[DE82-905834] N83-24918
A value-assessment aid to complex decision making
[DE82-905815] N83-25490

SPACE SCIENCE AND ENGINEERING CENTER, MADISON, WIS.

A life history method for estimating convective rainfall N83-25293

SPECTROLAB, INC., SYLMAR, CALIF.

Photovoltaic measurement equipment needs. View of a prospective supplier N83-25094

SPERRY FLIGHT SYSTEMS, PHOENIX, ARIZ.

The design and development of a mounting and jettison assembly for the shuttle orbiter advanced gimbal system N83-24899

SPERRY UNIVAC, ST. PAUL, MINN.

Alterable magnetic gratings for fiber optic switching
[AD-A123571] N83-25551

SPIRE CORP., BEDFORD, MASS.

Design and fabrication of air- and liquid-cooled photovoltaic/thermal collectors
[DOE/ET-20279/162] N83-25053
Photovoltaic measurement equipment needs. View of a supplier N83-25095

SRI INTERNATIONAL CORP., MENLO PARK, CALIF.

Identification and cleavage of breakable single bonds by selective oxidation, reduction, and hydrolysis
[DE82-021276] N83-24597
Exploratory study of coal-conversion chemistry
[DE82-020736] N83-24608
Identification and cleavage of breakable single bonds by selective oxidation, reduction and hydrolysis
[DE82-011870] N83-24622
Man-machine cooperation for action planning
[AD-A124243] N83-25373
Jovial program verifier rugged Jovial environment
[AD-A123681] N83-25402
Recovering intrinsic scene characteristics from images
[AD-A123185] N83-25552
Remote sensing of the optical and physical densities of smoke, dust, and water clouds
[AD-A124321] N83-25556

STANFORD UNIV., CALIF.

Performance evaluation of multihop packet radio systems
[AD-A123574] N83-24754
Research on algorithms for adaptive array antennas
[AD-A123419] N83-24759
An experimental study of the dynamics of an unsteady turbulent boundary layer
[NASA-CR-170278] N83-24816
Materials for high-temperature thermoelectric conversion
[NASA-CR-170316] N83-25035
Interplanetary magnetic field and tropospheric circulation
[NASA-CR-170277] N83-25251
Sparse matrix methods in optimization
[AD-A124397] N83-25442
The r-Stirling numbers
[AD-A123472] N83-25450
Emission, absorption and polarization of gyrosynchrotron radiation of mildly relativistic particles
[NASA-CR-170338] N83-25505
The structure of the heliospheric current sheet, 1978 - 1982
[NASA-CR-170307] N83-25645
Energy release in solar flares
[NASA-CR-170133] N83-25649

STAPENHORST (F. W. E.), INC., POINTE CLAIRE (QUEBEC).

Goodyear Lake hydroelectric generating station redevelopment
[DE83-004753] N83-25127

STATE UNIV. OF NEW YORK, BINGHAMTON.

The distributions of measures of visibility on line segments in three dimensional spaces under Poisson shadowing processes
[AD-A123183] N83-25458

STATE UNIV. OF NEW YORK, BUFFALO.

Cathodic stripping analysis complicated by adsorption processes: Determination of 2-thiouracil at a rotating silver disk electrode
[AD-A124296] N83-24580

STATE UNIV. OF NEW YORK, STONY BROOK.

Characterization of imperfections in plasma-sprayed titania
[DE83-004813] N83-25610

STEARNS-ROGER CORP., DENVER, COLO.

Cost and performance of thermal storage concepts in solar thermal systems N83-25090

STEVENS POINT AREA CO-OP, WIS.

Passive-solar collector: A Trombe-wall retrofit guide
[DE83-005189] N83-25123

Cooperative passive-solar commercial retrofit
[DE83-005269] N83-25170
STILSON (ALDEN E.) AND ASSOCIATES, COLUMBUS, OHIO.
Rotating field collector subsystem phase 1 study and evaluation
[DE83-003316] N83-25128
SYNERGIC RESOURCES CORP., BALA-CYNWYD, PA.
Evaluation of dual-energy-use systems. Volume 1: Executive summary
[DE83-900758] N83-25198
Evaluation of dual-energy-use systems, volume 2
[DE83-900757] N83-25199
SYRACUSE UNIV., N. Y.
Software reliability modelling and estimation techniques
[AD-A123421] N83-25414
SYSTEM DEVELOPMENT CORP., DAYTON, OHIO.
The user-assisted automated experimental (TEST) design program (AED): Version 2
[AD-A124303] N83-25400
SYSTEMS CONTROL TECHNOLOGY, INC., WEST PALM BEACH, FLA.
Alaska Loran-C flight test evaluation
[FAA-PM-83-4] N83-24491
SYSTEMS RESEARCH LABS., INC., DAYTON, OHIO.
Behavioral and physiological effects of psychological stress in rats
[AD-A123428] N83-25345
Subsidiary radio communications tasks for workload assessment in R&D simulations. 2: Task sensitivity evaluation
[AD-A122545] N83-25375
SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Proposed MIL standard and handbook: Flying qualities of air vehicles. Volume 1: Proposed MIL standard
[AD-A123674] N83-24468

T

TCOM CORP., COLUMBIA, MD.
Cold weather aerostat study
[AD-A123407] N83-24484
TECHNICOLOR GRAPHICS, INC., SIOUX FALLS, S. DAK.
An investigation of MAGSAT and complementary data emphasizing precambrian shields and adjacent areas of West Africa and South America
[E83-10296] N83-24999
TECHNION - ISRAEL INST. OF TECH., HAIFA.
A critical review of pulsating combustion
[TAE-468] N83-24576
TECHNOLOGY SERVICE CORP., SILVER SPRING, MD.
Bistatic radar meteorological satellite N83-25314
TELIC CORP., SANTA MONICA, CALIF.
Investigation of continuous deposition of AMA-type coatings onto strip and sheet by sputtering
[DE83-005692] N83-24687
TEMPLE UNIV., PHILADELPHIA, PA.
Some statistical problems inherent in measuring precipitation N83-25284
TENNESSEE UNIV., KNOXVILLE.
Evaluation of stratified thermal-storage system for Oliver Springs Elementary School
[DE82-020839] N83-25159
TENNESSEE UNIV., TULLAHOMA.
High-temperature combustion of pulverized coal
[DE82-022505] N83-24589
TEXACO, INC., EL MONTE, CALIF.
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
TEXAS A&M UNIV., COLLEGE STATION.
Definition of forces on turbomachinery rotors. Task B report: Dynamic analysis of rotors
[NASA-CR-170763] N83-24507
Detection of arcing faults on distribution feeders
[DE83-900993] N83-24786
Computer modeling of heat pipe performance
[NASA-CR-171641] N83-24806
AVE/VAS 4: 25-mb sounding data
[NASA-CR-170739] N83-25266
AVE/VAS 5: 25-mb sounding data
[NASA-CR-170740] N83-25267
Study of behavioral modifications resulting from exposure to high let radiation
[NASA-CR-171651] N83-25350
Collisionally excited few-electron systems: Theoretical introduction and survey
[DE82-020805] N83-25516
TEXAS INSTRUMENTS, INC., DALLAS.
The use of test structures for reliability prediction and process control of integrated circuits and photovoltaics N83-25096
TEXAS INSTRUMENTS, INC., LEWISVILLE.
Programmable Image Processing Element (PIPE)
[AD-A123443] N83-25412
TEXAS SOUTHERN UNIV., HOUSTON.
Field method for sulfide determination
[DE82-017044] N83-25227
TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
Design evaluation of an improved indirect evaporative cooling system
[DE83-900876] N83-25213
TEXAS UNIV., AUSTIN.
Methyl methacylate polymer-concrete for bomb damage repair
[AD-A123346] N83-24699
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
THEISEN (PHILLIP), MADISON, WIS.
Low-cost process-heat recovery
[DE82-016652] N83-25138
THERMO ELECTRON CORP., WALTHAM, MASS.
Preliminary investigations of thermionic converters utilizing HOTEMA and DFVLR electrodes
[DE83-004107] N83-25203
TRANS SYSTEMS CORP., VIENNA, VA.
An analysis of reports of operational errors
[AD-A123416] N83-24499
TRI-CON ASSOCIATES, INC., CAMBRIDGE, MASS.
Research, design and development study to measure atmospheric optical turbulence
[AD-A123392] N83-25256
TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Determination of Al in GA(1-x)Al(x)As by Auger spectroscopy, ion microprobe mass analysis, and photoluminescence
[AD-A124300] N83-24582
TRW, INC., MCLEAN, VA.
Chemical heat pump cost effectiveness evaluation N83-25067
TRW, INC., OAK RIDGE, TENN.
Alternatives to ceramic bricks and ceramic brick systems N83-25071
TULANE UNIV., NEW ORLEANS, LA.
Cervical spine stiffness and geometry of the young human male
[AD-A123535] N83-25351

U

UNC NUCLEAR INDUSTRIES, INC., RICHLAND, WASH.
A digital image processor as a human factors engineering tool
[DE82-015173] N83-25376
UNION CARBIDE CORP., OAK RIDGE, TENN.
Flywheel evaluation at ORFEL rotor testing in FY 1982
[DE82-020625] N83-25161
Moment series for moment estimators of the parameters of a Weibull density
[DE82-018265] N83-25473
UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Effect of gasifier-feed-rate variations on coal-gas-combustion characteristics
[DE82-905367] N83-24626
Parameter monitoring for corrosion control of utility gas turbines
[DE83-900991] N83-24675
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
CARS diagnostics of high pressure combustion
[AD-A124304] N83-24584
UNIVERSITIES SPACE RESEARCH ASSOCIATION, COLUMBIA, MD.
Improved design of subcritical and supercritical cascades using complex characteristics and boundary layer correction
[NASA-CR-168166] N83-24474
UNIVERSITY COLL., LONDON (ENGLAND).
The plasma experiment on board meteosat-F2
[AD-A123377] N83-24535
UNIVERSITY OF CENTRAL FLORIDA, ORLANDO.
Estimating a family of distributions with applications to the extension of climatology
[AD-A123385] N83-25328
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Synthesis, kinetics, and photochemistry of the Chromium (III) dicyanoaqoEDTA complex
[AD-A124302] N83-24583
UTAH UNIV., SALT LAKE CITY.
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies
[DE82-009791] N83-24592
Parameterization of broadband solar radiation transfer in clear and cloudy atmospheres
[AD-A123396] N83-25257
Lithologic interpretation of the De Braga No. 2 and Richard Weishaupt No. 1 geothermal wells, Stillwater project, Churchill County, Nevada
[DE82-019935] N83-25261
Weighted least-squares estimates of the magnetotelluric transfer functions from nonstationary data
[DE83-004036] N83-25263

V

VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
Nonlinear transient analysis of layered composite plates
[AD-A123182] N83-24566
Development and application of analytical techniques to chemistry of donor solvent liquefaction
[DE82-012255] N83-24624
Estimating distributed lag coefficients when there are errors in the observed time series
[AD-A123460] N83-25468
VIRGINIA UNIV., CHARLOTTESVILLE.
Selection and evaluation of materials for electrochemical energy conversion devices: Electrochemical evaluation of nickel whisker electrodes N83-25060
VISIDYNE, INC., BURLINGTON, MASS.
BAMM II flight, 30 April 1982, engineering evaluation
[AD-A124292] N83-24481
VTN CONSOLIDATED, INC., IRVINE, CALIF.
Heber Known Geothermal Resources Area ethanol-fuel facility
[DE83-004775] N83-25209

W

WASHINGTON STATE ENERGY OFFICE, OLYMPIA.
Developing hydropower in Washington state. Volume 2: An electricity marketing manual
[DE82-017778] N83-25148
WASHINGTON STATE UNIV., PULLMAN.
Evaluation of a rectangular opposed-jet burner for pulverized-coal diffusion-flame studies
[DE82-009791] N83-24592
WASHINGTON UNIV., SEATTLE.
Dynamic fracture and depressurization in pipes
[DE82-905283] N83-24914
High temperature integrated thermal storage for solar thermal applications N83-25092
Pollutant transfer and sediment dispersal in the Washington-Oregon coastal zone
[DE83-004912] N83-25230
Electroweak interactions
[DE82-020146] N83-25494
WEAR SCIENCES, INC., ARNOLD, MD.
Lubrication with naturally occurring double oxide films
[AD-A124248] N83-24698
WEST TEXAS STATE UNIV., CANYON.
Wind-assist irrigation and electrical-power generation
[DE83-900882] N83-25212
WEST VIRGINIA UNIV., MORGANTOWN.
Structural geology of the Moorman syncline area of western Kentucky
[DE82-022305] N83-25258
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
Carrier transport study in silicon devices: Electrical and optical studies of multi-layer insulators for memory device applications
[AD-A123648] N83-24775
WESTINGHOUSE ELECTRIC CORP., MADISON, PA.
Advanced coal-gasification system for electric-power generation
[DE82-021338] N83-25141
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Gas characterization from fluidized-bed coal gasification
[DE82-021179] N83-24598
Evaluation of safety-parameter display concepts, volume 2
[DE82-902072] N83-24737
Demonstration of new high-performance batteries in coal-mining scoops
[DE82-020535] N83-25145
WESTINGHOUSE ELECTRIC CORP., WEST LAFAYETTE, IND.
Compressed-air energy-storage preliminary design and site development program in an aquifer. Volume 8: Aquifer flow code simulation
[DE83-005730] N83-25166
WESTINGHOUSE HANFORD CO., RICHLAND, WASH.
HFIR/FFTF irradiation experiment, final design phase N83-24651

The ductility behavior of irradiated path alloys N83-24658
Mechanical property evaluations of path C vanadium scoping alloys N83-24659
Microstructural examination of HT-9 irradiated in the HFIR-CTR-32 experiment N83-24662
Fracture toughness of unirradiated HT-9 and modified 9Cr-1Mo welds N83-24664
Miniature Charpy impact test results for irradiated ferritic alloys N83-24668

WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Development of copper sulfide/cadmium sulfide thin-film solar cells
[DE82-013339] N83-25191

WHITTAKER CORP., NORTH HOLLYWOOD, CALIF.
Projectile impact ignition characteristics of propellants
[AD-A122944] N83-24715

WISCONSIN LEGISLATIVE COUNCIL, MADISON.
Acid rain: A background report
[DE83-901079] N83-25236

WISCONSIN UNIV., MADISON.
The bidimensional Stefan problem with convection: The time-dependent case
[AD-A124377] N83-24810
Capillary surface continuity above irregular domains
[AD-A124384] N83-24811
Continuum modeling of two-phase flows
[AD-A124385] N83-24812
Viscous flow of a droplet on a flat surface
[AD-A124396] N83-24813
Carbon Dioxide Effects Research and Assessment Program. Environmental and societal consequences of a possible CO2 induced climate change. Volume 2, part 1: Response of the West Antarctic Ice Sheet to CO2-induced climatic warming
[DOE/EV-10019/02-VOL-2-PT-1] N83-25222
Frontogenesis in an advective mixed layer model
[AD-A124350] N83-25321
Existence of forced oscillations for some nonlinear differential equations
[AD-A124372] N83-25439
Initial boundary value problems for the equations of motion of compressible viscous and heat-conductive fluids
[AD-A124382] N83-25440
Highlights of the history of the lambda-calculus
[AD-A124383] N83-25441
On the domain space for constitutive laws in linear viscoelasticity
[AD-A124360] N83-25443
A diffusion equation with a nonmonotone constitutive function
[AD-A124345] N83-25444
N-width and entropy of H(p)-classes in L(g) (-1,1)
[AD-A124346] N83-25445
On a Volterra equation with a locally finite measure and L infinity perturbation
[AD-A124347] N83-25446
Hidden line elimination in projected grid surfaces
[AD-A124348] N83-25447
A nonlinear volterra integrodifferential equation occurring in heat flow
[AD-A124349] N83-25448
Mean values of subsolutions of elliptic and parabolic equations
[AD-A124355] N83-25449
Convergence rates for multivariate smoothing spline functions
[AD-A124368] N83-25452
Periodic solutions of non-dissipatively perturbed wave equations in several space variables
[AD-A124367] N83-25453
Recursive estimation procedures for missing-data problems
[AD-A124358] N83-25462
Two approximations of solutions of Hamilton-Jacobi equations
[AD-A124359] N83-25464
Difficulties with regression analysis of age-adjusted rates
[AD-A124381] N83-25476
Percentage points and power calculations for Outlier tests in a regression situation
[AD-A124369] N83-25482
Compact toroidal plasmas: Simulations and theory
[DE82-018107] N83-25567
TMX tandem-mirror experiments and thermal-barrier theoretical studies
[DE82-020352] N83-25570
Neoclassical flows and transport in nonaxisymmetric toroidal plasmas
[DE82-021691] N83-25574
Thermal-barrier trapping current in a tandem mirror
[DE82-021695] N83-25579

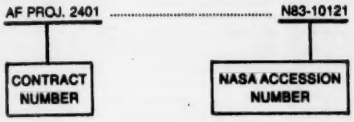
WISCONSIN UNIV., STOUGHTON.
Study of III-V semiconductor band structure by synchrotron photoemission
[DE82-016331] N83-25604

WOODS HOLE OCEANOGRAPHIC INSTITUTION, MASS.
Summer Study Program in Geophysical Fluid Dynamics: Particle Motions in Fluids
[AD-A122864] N83-24932

WRIGHT STATE UNIV., DAYTON, OHIO.
Conversion of existing continuous control systems into digital control systems
[AD-A123167] N83-24783

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. C503 ..... N83-25555
AF PROJ. C654 ..... N83-24546
N83-24547
AF PROJ. 2A10 ..... N83-25254
AF PROJ. 649L N83-24779
N83-25592
AF PROJ. 2002 ..... N83-24781
AF PROJ. 2104 ..... N83-24699
AF PROJ. 2123 ..... N83-24481
AF PROJ. 2217 ..... N83-24746
AF PROJ. 2304 ..... N83-24783
N83-25457
N83-25492
AF PROJ. 2305 ..... N83-24748
N83-24759
AF PROJ. 2306 ..... N83-24645
N83-24646
AF PROJ. 2307 ..... N83-24510
N83-24566
N83-24569
AF PROJ. 2308 ..... N83-24588
AF PROJ. 2309 ..... N83-25413
N83-25469
AF PROJ. 2310 ..... N83-25253
N83-25257
N83-25467
AF PROJ. 2312 ..... N83-25356
N83-25365
AF PROJ. 2338 ..... N83-24749
AF PROJ. 2361 ..... N83-24523
AF PROJ. 2403 ..... N83-24468
AF PROJ. 2418 ..... N83-24577
N83-24697
AF PROJ. 2422 ..... N83-25591
AF PROJ. 2532 ..... N83-25402
AF PROJ. 2892 ..... N83-24484
AF PROJ. 3048 ..... N83-24696
AF PROJ. 3145 ..... N83-25113
AF PROJ. 4506 ..... N83-25456
AF PROJ. 4519 ..... N83-25548
AF PROJ. 4643 ..... N83-25245
N83-25247
N83-25249
N83-25547
AF PROJ. 5581 ..... N83-25414
AF PROJ. 6096 ..... N83-25412
AF PROJ. 6670 ..... N83-25328
N83-25329
N83-25331
AF PROJ. 6687 ..... N83-25248
N83-25256
AF PROJ. 6690 ..... N83-25252
AF PROJ. 7184 ..... N83-24503
N83-25375
N83-25400
AF PROJ. 7231 ..... N83-25351
N83-25355
AF PROJ. 7601 ..... N83-24535
AF PROJ. 7659 ..... N83-25404
AF PROJ. 7757 ..... N83-25345
N83-25366
AF PROJ. 7820 ..... N83-25550
AF-AFOSR-0005-82 ..... N83-24845
AF-AFOSR-0058-82 ..... N83-24845
AF-AFOSR-0130-80 ..... N83-25356
AF-AFOSR-0132-81 ..... N83-24783
AF-AFOSR-0142-81 ..... N83-24566
AF-AFOSR-0170-80 ..... N83-25492
AF-AFOSR-0192-80 ..... N83-25432
AF-AFOSR-0250-81 ..... N83-25456
AF-AFOSR-3633-78 ..... N83-25488
ARO-1-80 ..... N83-24816
ARO-1-82 ..... N83-24816
ARO-2-81 ..... N83-24816
ARPA ORDER 512 ..... N83-25254
ARPA ORDER 2894 ..... N83-25552
ARPA ORDER 3503 ..... N83-25555
N83-25557
ARPA ORDER 3597 ..... N83-24777
N83-24780
N83-25382
N83-25398
N83-25451
N83-25455
ARPA ORDER 3654 ..... N83-24546
ARPA ORDER 4284 ..... N83-25599
ARPA ORDER 4468 ..... N83-25546
ARPA ORDER 4477 ..... N83-24698
ARPA ORDER 9345 ..... N83-25518
DA PROJ. 1H4-64202-DL-62 ..... N83-24502
DA PROJ. 1L1-61101-A-91A N83-25549
DA PROJ. 1L1-61102-A-71A N83-24578
DA PROJ. 1L1-61102-AH-42 ..... N83-24818
DA PROJ. 1L1-61102-AH-43 ..... N83-24485
N83-24643
DA PROJ. 1L1-62618-AH-80 ..... N83-25481
DA PROJ. 1L6-62616-AB-77 ..... N83-24755
DA PROJ. 1T1-61102-BH-57 ..... N83-24644
DA PROJ. 4A1-61102-AT-22 ..... N83-24733
DA PROJ. 4A1-61102-B-52-C N83-25009
DA PROJ. 4A7-62707-A-855 ..... N83-25007
N83-25008
DA PROJ. 8X3-63304-D-215 ..... N83-24563
DAAG29-78-G-0137 ..... N83-24700
DAAG29-78-G-0168 ..... N83-24761
DAAG29-79-C-0008 ..... N83-24584
DAAG29-79-C-0026 ..... N83-24775
DAAG29-79-C-0082 ..... N83-24744
DAAG29-79-C-0110 ..... N83-25442
DAAG29-79-C-0138 ..... N83-24754
DAAG29-79-C-0216 ..... N83-25552
DAAG29-80-C-0003 ..... N83-25556
DAAG29-80-C-0041 ..... N83-24810
N83-24811
N83-24812
N83-24813
N83-25321
N83-25439
N83-25440
N83-25441
N83-25443
N83-25444
N83-25445
N83-25446
N83-25447
N83-25448
N83-25449
N83-25452
N83-25453
N83-25462
N83-25464
N83-25476
N83-25482
DAAG29-80-C-0113 ..... N83-25482
DAAG29-80-C-0121 ..... N83-24715
DAAG29-80-C-0134 ..... N83-25551
DAAG29-80-C-0147 ..... N83-24700
DAAG29-80-C-0150 ..... N83-25596
DAAG29-81-C-0033 ..... N83-24756
DAAG29-81-K-0132 ..... N83-25491
DAAG29-81-K-0156 ..... N83-25442
DAAG29-82-K-0084 ..... N83-24757
DAAG29-82-K-0197 ..... N83-25432
DAAG46-79-C-0056 ..... N83-24563
DAAK11-80-C-0051 ..... N83-24578
DAAK21-81-C-0116 ..... N83-24755
DAAK70-81-C-0059 ..... N83-25617
DAAK80-81-C-0107 ..... N83-25410
DAAK80-81-C-0108 ..... N83-25406
N83-25407
N83-25408
N83-25409
DAJA37-80-C-0372 ..... N83-24644
DAMD17-78-C-8040 ..... N83-25364
DASG60-80-C-0007 ..... N83-24548
N83-25459
N83-25484
N83-25485
N83-25487
DE-AB01-76CS-31020 ..... N83-25195
DE-AC01-76ET-10261 ..... N83-25231
DE-AC01-76ET-10615 ..... N83-25179
N83-25180
N83-25181
DE-AC01-76ET-12581 ..... N83-25145
DE-AC01-79ET-11029 ..... N83-24828
DE-AC01-80CS-80004 ..... N83-24723
DE-AC01-80EV-10354 ..... N83-25215
DE-AC01-81ER-30015 ..... N83-24618
DE-AC01-81EV-10859 ..... N83-24739
DE-AC02-76CH-00016 ..... N83-24679
N83-24680
N83-24688
N83-24790
N83-25081
N83-25224
N83-25229
N83-25233
N83-25335
N83-25510
N83-25521
N83-25604
N83-25605
DE-AC02-76CH-03000 ..... N83-24738
DE-AC02-76ER-01198 ..... N83-24707
N83-25607
DE-AC02-76ER-02119 ..... N83-25612
DE-AC02-76ER-02203 ..... N83-25559
DE-AC02-76ER-02383 ..... N83-25422
DE-AC02-76ER-03130 ..... N83-25475
DE-AC02-76ET-11292 ..... N83-25203
DE-AC02-76ET-20279 ..... N83-25052
N83-25053
N83-25054
N83-25055
N83-25169
DE-AC02-77CH-00178 ..... N83-24633
N83-25047
N83-25134
N83-25135
N83-25144
N83-25150
N83-25178
N83-25196
N83-25197
N83-25333
DE-AC02-78ER-05002 ..... N83-25606
DE-AC02-78ET-9232 ..... N83-25200
DE-AC02-78ET-29232 ..... N83-25050
N83-25201
DE-AC02-78ET-51013 ..... N83-25575
DE-AC02-79CS-50026 ..... N83-24721
DE-AC02-79ER-10436 ..... N83-25610
DE-AC02-79ER-10454 ..... N83-25519
DE-AC02-79ET-10815 ..... N83-24589
DE-AC02-80CS-83001 ..... N83-24630
DE-AC02-80ER-10554 ..... N83-24611
N83-24612
N83-24613
DE-AC02-80ER-10556 ..... N83-25609
DE-AC02-80ER-53104 ..... N83-25574
N83-25579
DE-AC02-81ER-10910 ..... N83-24691
DE-AC02-81ER-10970 ..... N83-24619
DE-AC02-82CH-10122 ..... N83-25204
DE-AC02-82ER-12064 ..... N83-25611
DE-AC02-82ER-60055 ..... N83-24617

DE-AC02-82ER-60104 ..... N83-25332
DE-AC02-87ER-53128 ..... N83-25509
DE-AC03-76ET-53057 ..... N83-25569
DE-AC03-76SF-00098 ..... N83-24682
N83-24825
N83-24852
N83-24933
N83-25132
N83-25188
N83-25233
N83-25234
N83-25334
N83-25383
N83-25495
N83-25511
N83-25514
N83-25522
N83-25526
N83-25572
N83-25576
N83-25601
N83-25606
DE-AC03-76SF-00326 ..... N83-25442
DE-AC03-80ET-20651 ..... N83-25122
DE-AC04-76DP-00053 ..... N83-24607
N83-24676
N83-24686
N83-24841
N83-25531
N83-25532
N83-25536
DE-AC04-76DP-00487 ..... N83-24718
DE-AC04-76DP-00613 ..... N83-24570
N83-24620
N83-24632
N83-24708
N83-24788
N83-25427
DE-AC04-76DP-00789 ..... N83-24486
N83-24557
N83-24689
N83-24693
N83-24722
N83-24787
N83-24820
N83-24824
N83-24839
N83-24866
N83-24916
N83-24917
N83-24919
N83-25128
N83-25130
N83-25139
N83-25142
N83-25154
N83-25167
N83-25168
N83-25171
N83-25172
N83-25173
N83-25174
N83-25176
N83-25189
N83-25190
N83-25192
N83-25193
N83-25194
N83-25202
N83-25226
N83-25385
N83-25423
N83-25426
N83-25474
N83-25560
N83-25602
N83-25603
N83-25626
DE-AC04-76DP-03533 ..... N83-24631
N83-24831
N83-24840
N83-25151
DE-AC04-77DP-00789 ..... N83-25146
DE-AC04-80AL-13116 ..... N83-24687
DE-AC05-77ET-10112 ..... N83-24601
DE-AC05-77ET-10152 ..... N83-25187
DE-AC05-78OR-03054 ..... N83-24627
DE-AC06-76FF-02170 ..... N83-24683
N83-24872
DE-AC06-76RL-01830 ..... N83-24621
N83-24678
N83-24871
N83-25049
N83-25153
N83-25527
N83-25528
N83-25620
DE-AC06-76RL-01857 ..... N83-25376
DE-AC06-81ER-40048 ..... N83-25494
DE-AC07-76ID-01570 ..... N83-25018
N83-25149
DE-AC07-78ID-01745 ..... N83-25228
DE-AC07-79ID-01675 ..... N83-24610
DE-AC07-79ID-12079 ..... N83-25261
N83-25263
DE-AC08-76NV-01183 ..... N83-25635
DE-AC08-78DP-40030 ..... N83-24847
DE-AC08-78DP-40045 ..... N83-24848
DE-AC09-76SR-00001 ..... N83-24692
N83-24865
DE-AC11-76PN-00014 ..... N83-24684
N83-24736
DE-AC13-76GJ-01664 ..... N83-25022
DE-AC13-77GJ-01678 ..... N83-25014
N83-25015
N83-25016
N83-25017
DE-AC18-81FC-10281 ..... N83-24815
DE-AC19-81BC-10430 ..... N83-24719
DE-AC21-80ET-14752 ..... N83-25141
DE-AC21-81MC-16024 ..... N83-24598
DE-AC21-81MC-16463 ..... N83-25019
N83-25256
DE-AC21-81MC-19170 ..... N83-25219
DE-AC22-76ET-10154 ..... N83-25133
DE-AC22-78ET-11423 ..... N83-24597
N83-24622
DE-AC22-79ET-14800 ..... N83-24600
DE-AC22-80PC-30041 ..... N83-24624
DE-AC22-80PC-30075 ..... N83-24625
DE-AC22-80PC-30293 ..... N83-24599
DE-AC22-81PC-40005 ..... N83-24600
DE-AC22-81PC-40265 ..... N83-24602
DE-AC22-81PC-40785 ..... N83-24608
DE-AC022-77CH-00178 ..... N83-25191
DE-AI01-76ET-20356 ..... N83-25034
DE-AI01-77CS-51040 ..... N83-24505
DE-AI01-79ET-20485 ..... N83-25041
DE-AI01-80CS-50194 ..... N83-24857
DE-AI04-80AL-12726 ..... N83-25042
DE-AI05-80OR-20679 ..... N83-24915
DE-AI08-79DP-40092 ..... N83-24844
DE-AM03-76SF-0893 ..... N83-24913
DE-AS02-76ER-02945 ..... N83-24594
DE-AS02-77ER-04461 ..... N83-24677
DE-AS05-76ER-02408 ..... N83-25523
DE-AS05-76EV-03018 ..... N83-24609
DE-AS05-78EV-06047 ..... N83-25223
DE-AS05-79EV-10049 ..... N83-25237
DE-AS08-81DP-40163 ..... N83-25565
DE-AT01-76ET-10693 ..... N83-24596
DE-AT03-76ER-72018 ..... N83-25442
DE-AT06-76EV-71025 ..... N83-25230
DE-AT06-79ER-10435 ..... N83-24590
DE-AT06-81EV-10611 ..... N83-25235
DE-FC03-80RA-50076 ..... N83-24554
N83-25119
N83-25120
N83-25175
N83-25177
N83-25205
N83-25206
N83-25207
N83-25208
N83-25214
DE-FC07-79ID-12030 ..... N83-25023
DE-FC07-79RA-23211 ..... N83-25127
DE-FG01-81RA-50552 ..... N83-25184
N83-25185
DE-FG02-80CS-40337 ..... N83-25125
N83-25126
N83-25211
DE-FG02-80R5-10251 ..... N83-25138
DE-FG02-80R5-10252 ..... N83-25123
N83-25170
DE-FG02-81AF-92017 ..... N83-24716
DE-FG02-81R5-10333 ..... N83-25123
DE-FG03-80SF-11429 ..... N83-25209
DE-FG05-78ET-12339 ..... N83-25227
DE-FG06-80RO-01001 ..... N83-25148
DE-FG22-80PC-30216 ..... N83-24592
DE-FG22-80PC-30249 ..... N83-24603
DE-22-81ET-11423 ..... N83-24597
DEN3-98 ..... N83-24516
DI-14-08-0001-20129 ..... N83-24999
DNA PROJ. X99-QAXV N83-25554
DNA PROJ. 2029 ..... N83-25245
DNA001-81-C-0219 ..... N83-25554
DOT-FA77WAI-738 ..... N83-24515
DOT-FA79WA-4355 ..... N83-24742
DTFA01-80-C-10080 ..... N83-24491
DTFA01-81-Y-10512 ..... N83-25648
DTFA01-82-C-10008 ..... N83-24494
DTFA01-82-Y-10537 ..... N83-24492
DTFA01-82-Y-30523 ..... N83-24499
DTFA03-80-A-00215 ..... N83-24711
D33615-81-K-1539 ..... N83-25455
EF-77-C-01-2676 ..... N83-24801
EG-77-C-01-4042 ..... N83-25047
N83-25134
N83-25135
N83-25144
N83-25178
N83-25196
N83-25197
EG-77-G-01-4042 ..... N83-24633
EPA-78-D-X0394 ..... N83-25013
EPRI PROJ. S127-1 ..... N83-24616
EPRI PROJ. 231-1 ..... N83-24914
EPRI PROJ. 502-1 ..... N83-24873
EPRI PROJ. 502-2 ..... N83-24870
EPRI PROJ. 643-1 ..... N83-24675
EPRI PROJ. 691-5 ..... N83-24737
EPRI PROJ. 964-5 ..... N83-25418
EPRI PROJ. 979-6 ..... N83-25182
EPRI PROJ. 982-21 ..... N83-25020
EPRI PROJ. 985-1 ..... N83-24826
EPRI PROJ. 1081-3 ..... N83-25200
N83-25201
EPRI PROJ. 1199-15 ..... N83-25121
EPRI PROJ. 1233-1 ..... N83-25419
EPRI PROJ. 1276-8 ..... N83-25198
N83-25199
EPRI PROJ. 1285-3 ..... N83-24786
EPRI PROJ. 1391-4 ..... N83-25490
EPRI PROJ. 1398-5 ..... N83-24918
EPRI PROJ. 1550-1 ..... N83-25418
EPRI PROJ. 1810-2 ..... N83-25621
EPRI PROJ. 1996-1 ..... N83-25152
ET-78-C-01-2159 ..... N83-25050
N83-25200
EX-76-A-01-2295 ..... N83-24596
FAA PROJ. 161-350-400 ..... N83-24805
F04701-79-C-0052 ..... N83-24536
F04701-80-C-0033 ..... N83-24814
F04701-81-C-0082 ..... N83-24565
N83-24587
N83-25647
F04701-82-C-0083 ..... N83-24582
N83-25600
F08635-79-C-0103 ..... N83-24699
F19628-78-C-0207 ..... N83-25329
F19628-79-C-0027 ..... N83-25469
F19628-79-C-0067 ..... N83-25249
F19628-79-C-0172 ..... N83-25550
F19628-80-C-0002 ..... N83-24745
N83-24779
N83-25254
N83-25592
F19628-80-C-0050 ..... N83-25404
F19628-80-C-0153 ..... N83-25547
F19628-81-C-0005 ..... N83-25327
F19628-81-C-0041 ..... N83-25256
F19628-81-C-0047 ..... N83-25331
F19628-81-C-0141 ..... N83-25467
F19628-81-K-0011 ..... N83-25245
F19628-81-K-0042 ..... N83-25257
F19628-82-C-0001 ..... N83-24746
F19628-82-C-0043 ..... N83-24481
F19628-82-C-0113 ..... N83-24484
F19628-82-K-0001 ..... N83-25328
F19628-82-K-0022 ..... N83-25413
N83-25469
F19628-82-K-0039 ..... N83-24535
F30602-78-C-0031 ..... N83-25402
F30602-78-C-0351 ..... N83-25414
F30602-80-C-0046 ..... N83-24759
F30602-80-C-0136 ..... N83-24749
F30602-81-C-0179 ..... N83-24547
F30602-81-C-0187 ..... N83-24546
F30602-81-C-0223 ..... N83-25557
F30602-81-C-0281 ..... N83-25555
F33615-76-C-0526 ..... N83-25351
F33615-78-C-0018 ..... N83-24523
F33615-79-C-0503 ..... N83-25375
F33615-79-C-0505 ..... N83-25400
F33615-79-C-0526 ..... N83-25355
F33615-79-C-2079 ..... N83-25113
F33615-79-C-5088 ..... N83-24701
F33615-79-C-5108 ..... N83-24697
F33615-80-C-[illegible]03 ..... N83-25345
F33615-80-C-1180 ..... N83-25412
F33615-80-C-2017 ..... N83-24696
F33615-80-C-3604 ..... N83-24468
F33615-81-K-1429 ..... N83-24781
F33615-81-K-1539 ..... N83-24773
N83-24777
N83-24780

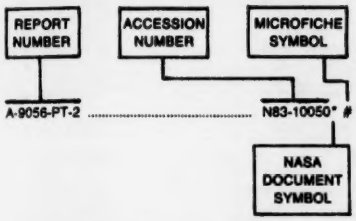
F33615-81-K-3032 ..... N83-24510
F49620-77-C-0069 ..... N83-24778
F49620-78-C-0004 ..... N83-24588
F49620-79-C-0039 ..... N83-24646
F49620-79-C-0058 ..... N83-25365
F49620-82-C-0064 ..... N83-25457
GS-RN-1-7060-0450 ..... N83-25011
IR/IED PROJ. A43105 ..... N83-25403
JPL-954373 ..... N83-25027
MDA903-79-C-0202 ..... N83-24751
MDA903-81-C-0354 ..... N83-25599
MDA903-82-C-0119 ..... N83-25546
MDA903-82-C-0434 ..... N83-24642
MRI PROJ. 7265-G N83-24618
MR0000101 ..... N83-25354
MR04101003 ..... N83-25354
N83-25360
M0096PN001 ..... N83-25352
NAGW-26 ..... N83-25343
NAGW-91 ..... N83-25641
NAGW-92 ..... N83-25649
NAGW-268 ..... N83-25035
NAG1-75 ..... N83-24796
NAG1-82 ..... N83-25538
NAG1-95 ..... N83-25039
NAG1-102 ..... N83-24543
NAG1-175 ..... N83-24797
NAG1-196 ..... N83-24558
NAG1-221 ..... N83-24469
NAG1-282 ..... N83-24512
NAG3-88 ..... N83-25026
NAG3-190 ..... N83-24795
NAG5-150 ..... N83-25236
NAG8-002 ..... N83-25640
NASA ORDER C-32369-C N83-24800
NASA ORDER S-12402-C N83-24998
NASW-3389 ..... N83-25638
NASW-3541 ..... N83-24555
N83-24573
NASW-3542 ..... N83-24528
NAS1-15477 ..... N83-24560
NAS1-15497 ..... N83-24500
NAS1-15678 ..... N83-24479
NAS1-15810 ..... N83-25377
N83-25432
NAS1-16083 ..... N83-24488
NAS1-16107 ..... N83-25496
NAS1-16394 ..... N83-24766
NAS1-16756 ..... N83-24544
NAS1-16886 ..... N83-25498
NAS1-16952 ..... N83-24876
NAS1-17070 ..... N83-24766
N83-25377
N83-25431
N83-25432
NAS1-17130 ..... N83-24766
N83-25431
NAS1-170070 ..... N83-25433
NAS2-10021 ..... N83-24504
NAS2-11045 ..... N83-25372
NAS2-11179 ..... N83-24515
NAS3-22217 ..... N83-25112
NAS3-22531 ..... N83-24474
NAS4-2995 ..... N83-24513
NAS5-24350 ..... N83-24995
NAS5-24420 ..... N83-25251
N83-25645
NAS5-24463 ..... N83-24887
NAS5-26343 ..... N83-25300
NAS5-26456 ..... N83-24996
NAS7-100 ..... N83-24572
N83-25541
NAS8-22511 ..... N83-25040
NAS8-31170 ..... N83-24833
NAS8-32564 ..... N83-25379
NAS8-33433 ..... N83-25320
NAS8-33722 ..... N83-24765
NAS8-33879 ..... N83-24538
NAS8-33893 ..... N83-25545
NAS8-33979 ..... N83-24541
NAS8-34133 ..... N83-25266
N83-25267
NAS8-34431 ..... N83-24529
NAS8-34505 ..... N83-24507
NAS8-34508 ..... N83-24537
N83-24727
NAS8-34544 ..... N83-24694
NAS8-34579 ..... N83-25537
NAS8-34591 ..... N83-25543
N83-25544
NAS8-34956 ..... N83-24531
NAS9-16303 ..... N83-24526
N83-24527
NAS9-16305 ..... N83-24550
N83-24551
NAS9-16312 ..... N83-25348
NAS9-16375 ..... N83-25350
NAS9-16606 ..... N83-24806
NATO-RG-054.80 ..... N83-25289
NCC1-6 ..... N83-25497
NCC3-11 ..... N83-24857
NGL-05-020-272 ..... N83-25649
NGL-12-001-057 ..... N83-25631
NGR-01-010-001 ..... N83-25344
NGR-05-002-160 ..... N83-25634
NGR-05-020-559 ..... N83-25251
N83-25645
NGR-05-020-668 ..... N83-25505
NGR-09-015-002 ..... N83-24920
NGR-14-001-171 ..... N83-25637
NGR-36-008-161 ..... N83-25006
NR PROJ. 041-519 ..... N83-25401
NR PROJ. 042-276 ..... N83-25458
NR PROJ. 044-422 ..... N83-24780
NR PROJ. 044-0422 ..... N83-24777
NR PROJ. 048-659 ..... N83-24777
N83-24780
NR PROJ. 051-609 ..... N83-24583
NR PROJ. 051-672 ..... N83-24837
NR PROJ. 051-715 ..... N83-24580
NR PROJ. 056-498 ..... N83-25597
N83-25598
NR PROJ. 056-703 ..... N83-24581
NR PROJ. 089-164 ..... N83-24747
NR PROJ. 097-431 ..... N83-24817
NR PROJ. 157-452 ..... N83-25370
NR PROJ. 356-670 ..... N83-24910
NR PROJ. 356-691 ..... N83-24564
N83-24834
NR PROJ. 384-302 ..... N83-25589
NR PROJ. 421-001 ..... N83-24846
NR PROJ. 667-430 ..... N83-25369
N83-25454
NSF ATM-77-20580 ..... N83-25251
N83-25645
NSF ATM-79-08666 ..... N83-25289
NSF ATM-80-03376 ..... N83-25289
NSF ATM-81-16989 ..... N83-25505
NSF DMR-80-11439 ..... N83-25610
NSF DMR-81-19295 ..... N83-24564
NSF ECS-79-19396 ..... N83-25488
NSF ECS-80-12974 ..... N83-25442
NSF ECS-81-06939 ..... N83-25461
NSF ECS-81-20270 ..... N83-25455
NSF ENG-77-17219 ..... N83-24564
NSF MCS-72-27062 ..... N83-25444
NSF MCS-77-23738 ..... N83-25450
NSF MCS-78-23676 ..... N83-24777
NSF MCS-79-2062 ..... N83-24811
NSF MCS-79-26009 ..... N83-25442
NSF MCS-79-27062 ..... N83-25443
N83-25445
N83-25452
N83-25453
NSF MCS-80-02946 ..... N83-25464
NSF MCS-81-01727 ..... N83-25492
NSF MCS-81-02114 ..... N83-25491
NSF MCS-82-00450 ..... N83-24932
NSF MCS-82-00632 ..... N83-25447
NSF PHY-79-09146 ..... N83-25516
NSF SES-80-14723 ..... N83-25374
NSG-1390 ..... N83-25586
NSG-1577 ..... N83-25430
NSG-3257 ..... N83-25043
NSG-7092 ..... N83-25505
N0014-78-C-0591 ..... N83-24564
N00014-79-C-0215 ..... N83-25369
N00014-75-C-0246 ..... N83-25589
N00014-75-C-0267 ..... N83-25442
N00014-75-C-0494 ..... N83-25468
N00014-75-C-0496 ..... N83-24784
N00014-75-C-0602 ..... N83-25597
N83-25598
N00014-75-C-0612 ..... N83-25415
N00014-75-C-0673 ..... N83-25649
N00014-75-C-1038 ..... N83-24647
N00014-76-C-0207 ..... N83-25251
N83-25645
N00014-76-C-0302 ..... N83-25478
N83-25479
N83-25480
N00014-76-C-0370 ..... N83-24773
N83-24777
N83-24780
N00014-76-C-0383 ..... N83-24585
N00014-76-C-0548 ..... N83-24583
N00014-76-C-0839 ..... N83-25486
N00014-76-K-0330 ..... N83-25450
N00014-77-C-0018 ..... N83-24586
N00014-77-C-0505 ..... N83-24567
N00014-77-C-0532 ..... N83-25401
N00014-77-C-0633 ..... N83-24910
N00014-77-C-1234 ..... N83-24910
N00014-78-C-0001 ..... N83-24837
N00014-78-C-0591 ..... N83-24834
N00014-79-C-0006 ..... N83-24817
N00014-79-C-0044 ..... N83-24581
N00014-79-C-0215 ..... N83-25454
N00014-79-C-0312 ..... N83-24845
N00014-79-C-0317 ..... N83-25364
N00014-79-C-0424 ..... N83-24782
N83-25461
N83-25488
N83-25588
N83-25590
N00014-79-C-0682 ..... N83-24580
N00014-79-C-0739 ..... N83-25463
N00014-80-C-0236 ..... N83-24773
N83-24777
N83-24780
N00014-80-C-0281 ..... N83-24909
N00014-80-C-0300 ..... N83-25373
N00014-80-C-0305 ..... N83-25553
N00014-80-C-0321 ..... N83-25397
N83-25477
N00014-80-C-0372 ..... N83-25370
N00014-80-C-0453 ..... N83-24482
N00014-80-C-0718 ..... N83-24703
N00014-81-C-0165 ..... N83-24846
N00014-81-C-0293 ..... N83-24843
N00014-81-K-056 ..... N83-25432
N00014-81-K-0014 ..... N83-25489
N00014-81-K-0090 ..... N83-24863
N00014-81-K-0144 ..... N83-24750
N00014-81-K-0146 ..... N83-24760
N83-25465
N00014-81-K-0407 ..... N83-25458
N00014-82-C-0073 ..... N83-24747
N00014-82-C-0237 ..... N83-25341
N00014-82-C-0247 ..... N83-24698
N00014-82-C-0436 ..... N83-25374
N00014-82-G-0079 ..... N83-24932
N00014-82-K-0257 ..... N83-25456
N00014-82-K-0496 ..... N83-25593
N00019-81-C-0093 ..... N83-24743
N00019-81-C-0451 ..... N83-24753
N00024-81-C-5301 ..... N83-25326
N00030-79-C-0163 ..... N83-24869
N00123-79-D-0616 ..... N83-24869
N00167-81-C-0087 ..... N83-24809
N62269-81-C-0279 ..... N83-25353
N62474-81-C-9382 ..... N83-24731
N68305-80-C-0012 ..... N83-25399
PHS-2-R01-H1-21253-04 ..... N83-25388
PROJ. AGRISTARS N83-24995
N83-25024
RR042060A N83-24780
RR0110941 ..... N83-24785
N83-25507
RR0210542 ..... N83-24758
RR0230141 ..... N83-24815
RR0240302 ..... N83-24817
RR0330244 ..... N83-25564
RR0420602 ..... N83-25370
RR0420901 ..... N83-25463
SF43400001 ..... N83-24730
SNLL-84-1986 ..... N83-25128
SRI PROJ. 1019 ..... N83-25552
SRI PROJ. 1335 ..... N83-25556
TENRAC EDF PROJ. 78-W-4-1 ..... N83-25212
TENRAC PROJ. 80-C-1-2 ..... N83-25213
USDA/FS-53-3187-2-24 ..... N83-25024
W-31-109-ENG-38 ..... N83-25045
N83-25046
N83-25131
N83-25136
N83-25137
N83-25216
N83-25421
W-7405-ENG-26 ..... N83-24591
N83-24593
N83-24606
N83-24629
N83-24648
N83-24681
N83-24704
N83-24724
N83-24728
N83-24734
N83-24735
N83-24791
N83-24801
N83-24821
N83-24823
N83-24827

N83-24838
N83-24912
N83-25013
N83-25021
N83-25057
N83-25140
N83-25156
N83-25157
N83-25158
N83-25159
N83-25160
N83-25161
N83-25162
N83-25163
N83-25164
N83-25165
N83-25218
N83-25260
N83-25264
N83-25367
N83-25386
N83-25387
N83-25434
N83-25435
N83-25470
N83-25472
N83-25473
N83-25491
N83-25508
N83-25516
N83-25517
N83-25520
N83-25524
N83-25558
N83-25566
N83-25571
N83-25585
N83-25618
W-7405-ENG-36 ..... N83-24705
N83-24792
N83-24793
N83-24819
N83-24822
N83-24851
N83-24853
N83-25129
N83-25143
N83-25147
N83-25155
N83-25232
N83-25262
N83-25336
N83-25368
N83-25380
N83-25381
N83-25384
N83-25393
N83-25420
N83-25424
N83-25483
N83-25515
N83-25529
N83-25533
N83-25534
N83-25563
N83-25567
N83-25568
N83-25616
W-7405-ENG-48 ..... N83-24568
N83-24569
N83-24595
N83-24604
N83-24605
N83-24614
N83-24685
N83-24706
N83-24709
N83-24762
N83-24789
N83-24825
N83-24849
N83-24850
N83-24854
N83-24867
N83-25115
N83-25225
N83-25259
N83-25394
N83-25425
N83-25429
N83-25471
N83-25504
N83-25512
N83-25513
N83-25518
N83-25530

W-7405-ENG-82 ..... N83-24623
WF53537401 ..... N83-24864
XF21242101 ..... N83-25411
YF60536091 ..... N83-25340
ZR00001183 ..... N83-25340
141-20-16 ..... N83-25003
146-40-06-03 ..... N83-25337
199-20-76-01 ..... N83-25525
199-60-12-10 ..... N83-25372
352-02-03 ..... N83-25630
505-31-0 ..... N83-24467
505-31-32 ..... N83-24470
505-31-42 ..... N83-24506
505-31-53-10 ..... N83-24542
505-32-42 ..... N83-24695
505-32-52 ..... N83-24474
N83-24798
505-32-82 ..... N83-24509
505-33-1B N83-24875
505-33-12 ..... N83-24575
505-33-32 ..... N83-24874
505-33-33-06 ..... N83-24561
505-33-52 ..... N83-24799
505-40-5A N83-24829
505-40-42 ..... N83-24858
505-42-11 ..... N83-24472
505-42-13-01 ..... N83-24471
505-42-23-01 ..... N83-24478
505-45-02 ..... N83-24487
505-53-1B N83-24634
505-55-52 ..... N83-24571
506-31-32 ..... N83-25499
506-51-13-03 ..... N83-24808
506-51-21-01-00-21 ..... N83-24473
506-53-1B N83-24636
N83-24637
N83-24855
N83-24856
506-53-12 ..... N83-24641
506-53-12B N83-24640
506-53-13 ..... N83-24635
506-53-23-05 ..... N83-24562
506-53-33-04 ..... N83-24794
506-54-63-01-00 ..... N83-25438
506-55-52 ..... N83-25038
506-55-72 ..... N83-24552
533-04-1B N83-24638
534-04-13-55 ..... N83-24490
776-16-02 ..... N83-25036
776-54-01 ..... N83-25041
776-72-41 ..... N83-25042
778-14-10 ..... N83-25037
778-35-03 ..... N83-25043
778-46-22 ..... N83-25625
779-34-12 ..... N83-24857
N83-25535
N83-25570
N83-25573
N83-25578
N83-25580
N83-25581
N83-25582
N83-25583
N83-25584
N83-25619

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9164 ..... N83-24473* #
A-9188 ..... N83-25003* #
A-9321 ..... N83-25630* #
A-9343 ..... N83-24472* #

ACT-36 ..... N83-25461 #

AD-A111360 ..... N83-25647 #
AD-A119497 ..... N83-24880 #
AD-A122107 ..... N83-25352 #
AD-A122182 ..... N83-25649* #
AD-A122224 ..... N83-25342 #
AD-A122226 ..... N83-25366 #
AD-A122297 ..... N83-25365 #
AD-A122392 ..... N83-25364 #
AD-A122495 ..... N83-25371 #
AD-A122511 ..... N83-25363 #
AD-A122525 ..... N83-25362 #
AD-A122545 ..... N83-25375 #
AD-A122567 ..... N83-25361 #
AD-A122796 ..... N83-25357 #
AD-A122797 ..... N83-25370 #
AD-A122809 ..... N83-25358 #
AD-A122832 ..... N83-25648 #
AD-A122864 ..... N83-24932 #
AD-A122944 ..... N83-24715 #
AD-A123002 ..... N83-24524 #
AD-A123022 ..... N83-25359 #
AD-A123118 ..... N83-24588 #
AD-A123149 ..... N83-25360 #
AD-A123153 ..... N83-24567 #
AD-A123163 ..... N83-25356 #
AD-A123166 ..... N83-24646 #
AD-A123167 ..... N83-24783 #
AD-A123175 ..... N83-25355 #
AD-A123176 ..... N83-24587 #
AD-A123177 ..... N83-24750 #
AD-A123178 ..... N83-24845 #
AD-A123181 ..... N83-25457 #
AD-A123182 ..... N83-24566 #
AD-A123183 ..... N83-25458 #
AD-A123185 ..... N83-25552 #
AD-A123220 ..... N83-25492 #
AD-A123224 ..... N83-24645 #
AD-A123299 ..... N83-24778 #
AD-A123300 ..... N83-25401 #
AD-A123304 ..... N83-25407 #
AD-A123305 ..... N83-25408 #
AD-A123306 ..... N83-25409 #
AD-A123307 ..... N83-25406 #
AD-A123308 ..... N83-25410 #
AD-A123313 ..... N83-25010 #
AD-A123315 ..... N83-24713 #
AD-A123317 ..... N83-25246 #
AD-A123321 ..... N83-24817 #
AD-A123322 ..... N83-24565 #
AD-A123326 ..... N83-25353 #
AD-A123327 ..... N83-25455 #
AD-A123328 ..... N83-24777 #
AD-A123334 ..... N83-24773 #
AD-A123335 ..... N83-25451 #
AD-A123340 ..... N83-24712 #
AD-A123342 ..... N83-25325 #
AD-A123343 ..... N83-24774 #
AD-A123344 ..... N83-24815 #
AD-A123345 ..... N83-24751 #
AD-A123346 ..... N83-24699 #
AD-A123347 ..... N83-25398 #
AD-A123351 ..... N83-25501 #
AD-A123352 ..... N83-25324 #
AD-A123358 ..... N83-24909 #
AD-A123362 ..... N83-25382 #
AD-A123365 ..... N83-24578 #
AD-A123366 ..... N83-25549 #
AD-A123369 ..... N83-25330 #
AD-A123372 ..... N83-25403 #
AD-A123374 ..... N83-24780 #
AD-A123377 ..... N83-24535 #
AD-A123378 ..... N83-25404 #
AD-A123380 ..... N83-24781 #
AD-A123381 ..... N83-25249 #
AD-A123383 ..... N83-24731 #
AD-A123384 ..... N83-25454 #
AD-A123385 ..... N83-25328 #
AD-A123386 ..... N83-25599 #
AD-A123388 ..... N83-25467 #
AD-A123389 ..... N83-24485 #
AD-A123391 ..... N83-24647 #
AD-A123392 ..... N83-25256 #
AD-A123393 ..... N83-24733 #
AD-A123394 ..... N83-25369 #
AD-A123395 ..... N83-25417 #
AD-A123396 ..... N83-25257 #
AD-A123397 ..... N83-25469 #
AD-A123402 ..... N83-25331 #
AD-A123403 ..... N83-24703 #
AD-A123405 ..... N83-24864 #
AD-A123406 ..... N83-25413* #
AD-A123407 ..... N83-24484 #
AD-A123414 ..... N83-24702 #
AD-A123415 ..... N83-24837 #
AD-A123416 ..... N83-24499 #
AD-A123419 ..... N83-24759 #
AD-A123420 ..... N83-25557 #
AD-A123421 ..... N83-25414 #
AD-A123424 ..... N83-25255 #
AD-A123427 ..... N83-25415 #
AD-A123428 ..... N83-25345 #
AD-A123434 ..... N83-25597 #
AD-A123435 ..... N83-25374 #
AD-A123438 ..... N83-25485 #
AD-A123440 ..... N83-25011 #
AD-A123443 ..... N83-25412 #
AD-A123444 ..... N83-25486 #
AD-A123448 ..... N83-25598 #
AD-A123449 ..... N83-25416 #
AD-A123454 ..... N83-24760 #
AD-A123460 ..... N83-25468 #
AD-A123467 ..... N83-25500 #
AD-A123468 ..... N83-24814 #
AD-A123472 ..... N83-25450 #
AD-A123474 ..... N83-25007 #
AD-A123496 ..... N83-25008 #
AD-A123507 ..... N83-24834 #
AD-A123510 ..... N83-25397 #
AD-A123511 ..... N83-25477 #
AD-A123512 ..... N83-24564 #
AD-A123517 ..... N83-25323 #
AD-A123522 ..... N83-25589 #
AD-A123530 ..... N83-24547 #
AD-A123532 ..... N83-25548 #
AD-A123534 ..... N83-24523 #
AD-A123535 ..... N83-25351 #
AD-A123538 ..... N83-25555 #
AD-A123539 ..... N83-24772 #
AD-A123540 ..... N83-24546 #
AD-A123541 ..... N83-24577 #
AD-A123549 ..... N83-25553 #
AD-A123554 ..... N83-24784 #
AD-A123559 ..... N83-24753 #
AD-A123560 ..... N83-25554 #
AD-A123566 ..... N83-25411 #
AD-A123569 ..... N83-25564 #
AD-A123571 ..... N83-25551 #
AD-A123574 ..... N83-24754 #
AD-A123577 ..... N83-25251* #
AD-A123579 ..... N83-24732 #
AD-A123580 ..... N83-24586 #
AD-A123581 ..... N83-24779 #
AD-A123584 ..... N83-24714 #
AD-A123585 ..... N83-24497 #
AD-A123589 ..... N83-25596 #
AD-A123595 ..... N83-24700 #
AD-A123631 ..... N83-24536 #
AD-A123633 ..... N83-25354 #
AD-A123635 ..... N83-25615 #
AD-A123643 ..... N83-24644 #
AD-A123648 ..... N83-24775 #
AD-A123651 ..... N83-25481 #
AD-A123659 ..... N83-25507 #
AD-A123660 ..... N83-24746 #
AD-A123669 ..... N83-24747 #
AD-A123670 ..... N83-24776 #
AD-A123674 ..... N83-24468 #
AD-A123676 ..... N83-25456 #
AD-A123681 ..... N83-25402 #
AD-A123682 ..... N83-25550 #
AD-A123691 ..... N83-25248 #
AD-A123693 ..... N83-24644 #
AD-A123694 ..... N83-25593 #
AD-A123695 ..... N83-24818 #
AD-A123696 ..... N83-24643 #
AD-A123698 ..... N83-24585 #
AD-A123702 ..... N83-25329 #
AD-A123703 ..... N83-24502 #
AD-A123704 ..... N83-24748 #
AD-A123705 ..... N83-24749 #
AD-A123706 ..... N83-25247 #
AD-A124087 ..... N83-25463 #
AD-A124156 ..... N83-24910 #
AD-A124184 ..... N83-24696 #
AD-A124189 ..... N83-24863 #
AD-A124191 ..... N83-25113 #
AD-A124193 ..... N83-24843 #
AD-A124196 ..... N83-25617 #
AD-A124197 ..... N83-25244 #
AD-A124198 ..... N83-25250 #
AD-A124199 ..... N83-24496 #
AD-A124215 ..... N83-25399 #
AD-A124234 ..... N83-24642 #
AD-A124235 ..... N83-25340 #
AD-A124236 ..... N83-25009 #
AD-A124243 ..... N83-25373 #
AD-A124244 ..... N83-24579 #
AD-A124247 ..... N83-24482 #
AD-A124248 ..... N83-24696 #
AD-A124250 ..... N83-25478 #
AD-A124251 ..... N83-25479 #
AD-A124252 ..... N83-25480 #
AD-A124254 ..... N83-24836 #
AD-A124259 ..... N83-25503 #
AD-A124264 ..... N83-24510 #
AD-A124267 ..... N83-24835 #
AD-A124272 ..... N83-25502 #
AD-A124275 ..... N83-25326 #
AD-A124276 ..... N83-25327 #
AD-A124277 ..... N83-25546 #
AD-A124280 ..... N83-25396 #
AD-A124281 ..... N83-25600 #
AD-A124282 ..... N83-24743 #
AD-A124283 ..... N83-25547 #
AD-A124288 ..... N83-24730 #
AD-A124290 ..... N83-24697 #
AD-A124291 ..... N83-25245 #
AD-A124292 ..... N83-24481 #
AD-A124294 ..... N83-24869 #
AD-A124295 ..... N83-25114 #
AD-A124296 ..... N83-24580 #
AD-A124298 ..... N83-24581 #
AD-A124299 ..... N83-25591 #
AD-A124300 ..... N83-24582 #
AD-A124301 ..... N83-24745 #
AD-A124302 ..... N83-24583 #
AD-A124303 ..... N83-25400 #
AD-A124304 ..... N83-24584 #
AD-A124305 ..... N83-25592 #
AD-A124307 ..... N83-24503 #

AD-A124312 ..... N83-24785 #
AD-A124313 ..... N83-24758 #
AD-A124314 ..... N83-25252 #
AD-A124315 ..... N83-25253 #
AD-A124321 ..... N83-25556 #
AD-A124322 ..... N83-25254 #
AD-A124323 ..... N83-24755 #
AD-A124324 ..... N83-24701 #
AD-A124326 ..... N83-24756 #
AD-A124342 ..... N83-24757 #
AD-A124343 ..... N83-24496 #
AD-A124344 ..... N83-25588 #
AD-A124345 ..... N83-25444 #
AD-A124346 ..... N83-25445 #
AD-A124347 ..... N83-25446 #
AD-A124348 ..... N83-25447 #
AD-A124349 ..... N83-25448 #
AD-A124350 ..... N83-25321 #
AD-A124351 ..... N83-25322 #
AD-A124355 ..... N83-25449 #
AD-A124358 ..... N83-25462 #
AD-A124359 ..... N83-25464 #
AD-A124360 ..... N83-25443 #
AD-A124364 ..... N83-24744 #
AD-A124365 ..... N83-24816 #
AD-A124367 ..... N83-25453 #
AD-A124368 ..... N83-25452 #
AD-A124369 ..... N83-25482 #
AD-A124371 ..... N83-24761 #
AD-A124372 ..... N83-25439 #
AD-A124374 ..... N83-24563 #
AD-A124377 ..... N83-24810 #
AD-A124381 ..... N83-25476 #
AD-A124382 ..... N83-25440 #
AD-A124383 ..... N83-25441 #
AD-A124384 ..... N83-24811 #
AD-A124385 ..... N83-24812 #
AD-A124388 ..... N83-25590 #
AD-A124396 ..... N83-24813 #
AD-A124397 ..... N83-25442 #
AD-A124494 ..... N83-24782 #
AD-A124625 ..... N83-25484 #
AD-A124627 ..... N83-25485 #
AD-A124628 ..... N83-24548 #
AD-A124631 ..... N83-25486 #
AD-A124633 ..... N83-24846 #
AD-A124634 ..... N83-25487 #
AD-A124635 ..... N83-25459 #
AD-A124637 ..... N83-25341 #
AD-A124638 ..... N83-25488 #
AD-A124639 ..... N83-25489 #
AD-A124684 ..... N83-24752 #
AD-A124685 ..... N83-24540 #
AD-A124687 ..... N83-25594 #
AD-A124688 ..... N83-24511 #
AD-A124689 ..... N83-25595 #
AD-A124690 ..... N83-25460 #
AD-A124691 ..... N83-25461 #
AD-A124692 ..... N83-25405 #
AD-A124693 ..... N83-24483 #
AD-A125529 ..... N83-24809 #

AD-E000520 ..... N83-24815 #
AD-E000525 ..... N83-24758 #
AD-E000526 ..... N83-24785 #
AD-E400926 ..... N83-24774 #
AD-E400938 ..... N83-25549 #
AD-E410617 ..... N83-24578 #
AD-E500560 ..... N83-24751 #
AD-E850214 ..... N83-25330 #
AD-E850216 ..... N83-25324 #
AD-E850217 ..... N83-25325 #

AD-F200045 ..... N83-25501 #
AD-F300164 ..... N83-24712 #
AD-F500117 ..... N83-25502 #

ADAPT-82-4 ..... N83-25331 #

AFAMRL-TR-80-138 ..... N83-25351 #
AFAMRL-TR-81-24 ..... N83-24503 #
AFAMRL-TR-82-57 ..... N83-25375 #
AFAMRL-TR-82-68-PT-3 ..... N83-25355 #
AFAMRL-TR-82-100 ..... N83-25400 #

AFESC/ESL-TR-82-04 ..... N83-24699 #

AFGL-ERP-787 ..... N83-25245 #
AFGL-ERP-788 ..... N83-25253 #
AFGL-ERP-789 ..... N83-25248 #
AFGL-ERP-792 ..... N83-25247 #
AFGL-ERP-793 ..... N83-25252 #

AFGL-TR-82-0168 ..... N83-25329 #
AFGL-TR-82-0189 ..... N83-24481 #
AFGL-TR-82-0222 ..... N83-25245 #
AFGL-TR-82-0231 ..... N83-25253 #
AFGL-TR-82-0235 ..... N83-25248 #
AFGL-TR-82-0239 ..... N83-25328 #
AFGL-TR-82-0248 ..... N83-25249 #
AFGL-TR-82-0258 ..... N83-25247 #
AFGL-TR-82-0264 ..... N83-25252 #
AFGL-TR-82-0272 ..... N83-25413* #
AFGL-TR-82-0276 ..... N83-24535 #
AFGL-TR-82-0278 ..... N83-24484 #
AFGL-TR-82-0295 ..... N83-25469 #
AFGL-TR-82-0298 ..... N83-25331 #
AFGL-TR-82-0306 ..... N83-25404 #
AFGL-TR-82-0308 ..... N83-25547 #
AFGL-TR-82-0309 ..... N83-25467 #
AFGL-TR-82-0328 ..... N83-25327 #
AFGL-TR-82-0329 ..... N83-25326 #
AFGL-TR-82-0334 ..... N83-25256 #
AFGL-TR-82-0364 ..... N83-25257 #

AFHRL-TR-82-30 ..... N83-24523 #

AFIT-LSSR-32-82 ..... N83-25358 #
AFIT-LSSR-63-82 ..... N83-25359 #
AFIT-LSSR-64-82 ..... N83-24524 #

AFIT/GAE/AA/82D-11 ..... N83-24511 #
AFIT/GAE/AA/82D-22 ..... N83-24483 #

AFIT/GE/EE/82D-25 ..... N83-24752 #
AFIT/GE/EE/82D-41 ..... N83-25405 #

AFIT/GEP/PH/82D-7 ..... N83-25594 #
AFIT/GEP/PH/82D-8 ..... N83-25595 #

AFIT/GSO/OS/82D-6 ..... N83-24540 #

AFOSR-82-1046TR ..... N83-25365 #
AFOSR-82-1059TR ..... N83-24646 #
AFOSR-82-1062TR ..... N83-24645 #
AFOSR-82-1063TR ..... N83-24566 #
AFOSR-82-1064TR ..... N83-24588 #
AFOSR-82-1067TR ..... N83-25356 #
AFOSR-82-1076TR ..... N83-24783 #
AFOSR-82-1079TR ..... N83-25492 #
AFOSR-82-1092TR ..... N83-25457 #

AFWAL-TR-82-1121 ..... N83-25412 #
AFWAL-TR-82-1141 ..... N83-24781 #
AFWAL-TR-82-2090 ..... N83-24696 #
AFWAL-TR-82-2108 ..... N83-25113 #
AFWAL-TR-82-3059 ..... N83-24510 #
AFWAL-TR-82-3076 ..... N83-24569 #
AFWAL-TR-82-3081-VOL-1 ..... N83-24468 #
AFWAL-TR-82-4044 ..... N83-24577 #
AFWAL-TR-82-4106 ..... N83-25591 #
AFWAL-TR-82-4139 ..... N83-24701 #
AFWAL-TR-82-4162 ..... N83-24697 #

AIAA-83-0026 ..... N83-24487* #
AIAA-83-1179 ..... N83-24505* #
AIAA-83-1483 ..... N83-24794* #

AMA-82-39 ..... N83-24500* #

AMMRC-MS-82-5 ..... N83-24880 #

AMMRC-TR-82-29 ..... N83-24563 #
AMMRC-TR-82-48 ..... N83-24818 #

AMTE(N)-TM82103 ..... N83-25503 #

ANL-81-67 ..... N83-25131 #
ANL-82-37 ..... N83-25421 #
ANL-82-40 ..... N83-25136 #

ANL/CNSV-29 ..... N83-25046 #

ANL/EES-TM-191 ..... N83-25216 #

ANL/OEPM-81-13 ..... N83-25137 #

ANL/OPEM-81-12 ..... N83-25045 #

AR-2 ..... N83-24817 #

ARAP-494 ..... N83-24531* #

ARBRL-TR-02456 ..... N83-24712 #
ARBRL-TR-02458 ..... N83-24485 #
ARBRL-TR-02459 ..... N83-25481 #
ARBRL-TR-02460 ..... N83-24643 #
ARBRL-TR-02463 ..... N83-24502 #

ARC-5274 ..... N83-24602 #

ARCSL-CR-82026 ..... N83-24578 #

ARLCD-TR-82025 ..... N83-25549 #

ARO-15098.4-MS ..... N83-24700 #
ARO-15369.2-EL ..... N83-24761 #
ARO-15824.1-MS ..... N83-24775 #
ARO-16124.6-CH ..... N83-24584 #
ARO-16258.7-EL ..... N83-24744 #
ARO-16692.3-GS ..... N83-25556 #
ARO-16760.2-EG ..... N83-24816 #
ARO-16783.6-EL-A ..... N83-24754 #
ARO-17127.5-EL-A ..... N83-25552 #
ARO-17201.2-EL ..... N83-25551 #
ARO-17247.8-EG ..... N83-24715 #
ARO-17694.1-EL-1 ..... N83-25596 #
ARO-18054.5-EL ..... N83-24757 #
ARO-18424.9-MA ..... N83-25442 #
ARO-18681.6-EL-2 ..... N83-24756 #

ARPAD-CR-82002 ..... N83-24774 #

ASR-2 ..... N83-25641* #

AVRADCOM-TR-82-B-9 ..... N83-24471* #
AVRADCOM-TR-83-C-2 ..... N83-24505* #
AVRADCOM-TR-83-C-3 ..... N83-24858* #

AX-122 ..... N83-25537* #

B-205654 ..... N83-25220 #
B-210236 ..... N83-25624 #

BARC-1118 ..... N83-24826 #
BARC-1135 ..... N83-24690 #

BBC-RD-1983/2 ..... N83-24741
BBC-RD-1983/3 ..... N83-24740

BBN-5114 ..... N83-25498* #

BDX-613-2818 ..... N83-24620 #
BDX-613-2819 ..... N83-24788 #
BDX-613-2865 ..... N83-24632 #
BDX-613-2875 ..... N83-24570 #
BDX-613-2877 ..... N83-24708 #
BDX-613-2886 ..... N83-25427 #

BMFT-FB-W-82-023 ..... N83-24522 #

BMO-TR-82-37 ..... N83-24814 #

BNL-NCS-31694 ..... N83-25510 #

BNL-30565 ..... N83-24679 #
BNL-30948 ..... N83-25233 #
BNL-31427 ..... N83-24790 #
BNL-31574 ..... N83-25604 #
BNL-31578 ..... N83-25605 #
BNL-31648 ..... N83-24688 #
BNL-31684 ..... N83-25521 #
BNL-31776 ..... N83-24680 #
BNL-51597 ..... N83-25229 #
BNL-51606 ..... N83-25335 #
BNL-51631 ..... N83-25224 #

BR-13539 ..... N83-25113 #

BROWN/HET-480 ..... N83-25475 #

BULL-82-08-EES-01 ..... N83-25023 #

C-KHPTI-82-83 ..... N83-25566 #

C-201 ..... N83-25256 #

CEA-R-5153 ..... N83-25562 #

CEGB-TDB-379 ..... N83-24908 #

CMR-83-2 ..... N83-25035* #

CMU-CS-82-115 ..... N83-24777 #
CMU-CS-82-117 ..... N83-25398 #
CMU-CS-82-119 ..... N83-25382 #
CMU-CS-82-120 ..... N83-25451 #
CMU-CS-82-132 ..... N83-24773 #
CMU-CS-82-133 ..... N83-24780 #
CMU-CS-82-136 ..... N83-25455 #

CONF-82062-10 ..... N83-24790 #
CONF-801249 ..... N83-25051 #
CONF-810613-12 ..... N83-24847 #
CONF-810754-4 ..... N83-25524 #
CONF-810818-1-REV ..... N83-24825 #
CONF-810940 ..... N83-25057 #
CONF-811013-23 ..... N83-25197 #
CONF-811215-10 ..... N83-25511 #

CONF-811240-2 ..... N83-25259 #
CONF-820114-1 ..... N83-25194 #
CONF-820115-1 ..... N83-24676 #
CONF-820117-2 ..... N83-25226 #
CONF-820134-2 ..... N83-25190 #
CONF-820153 ..... N83-25186 #
CONF-820154-1 ..... N83-25530 #
CONF-820304-3 ..... N83-25193 #
CONF-820306-8 ..... N83-24838 #
CONF-820306-9 ..... N83-24787 #
CONF-820308-2 ..... N83-25376 #
CONF-820314-1 ..... N83-24679 #
CONF-820338-8 ..... Nd3-25568 #
CONF-820403-3 ..... N83-24592 #
CONF-820424-23 ..... N83-25528 #
CONF-820435-2 ..... N83-24849 #
CONF-820449-2 ..... N83-24865 #
CONF-820459-3 ..... N83-24685 #
CONF-820475-1 ..... N83-25521 #
CONF-820475-2 ..... N83-25494 #
CONF-820476-1 ..... N83-24917 #
CONF-820517-2 ..... N83-24853 #
CONF-820546-9 ..... N83-25576 #
CONF-820546-10 ..... N83-25495 #
CONF-820548-5 ..... N83-25602 #
CONF-820563-6 ..... N83-24871 #
CONF-820566-1 ..... N83-25470 #
CONF-820601-3 ..... N83-24913 #
CONF-820604-12 ..... N83-24868 #
CONF-820624-4 ..... N83-25618 #
CONF-820628-17 ..... N83-24683 #
CONF-820654-3 ..... N83-25513 #
CONF-820685-2 ..... N83-25144 #
CONF-820694-3 ..... N83-25572 #
CONF-820698-2 ..... N83-25603 #
CONF-820729-2 ..... N83-25260 #
CONF-820732-2 ..... N83-25578 #
CONF-820737-1 ..... N83-25473 #
CONF-820738-2 ..... N83-25514 #
CONF-820743-1 ..... N83-24854 #
CONF-820744-1 ..... N83-25605 #
CONF-820801-13 ..... N83-25635 #
CONF-820803-3 ..... N83-25535 #
CONF-820807-3 ..... N83-24614 #
CONF-820809-4 ..... N83-24706 #
CONF-820810-10-REV-1 ..... N83-25573 #
CONF-820810-11 ..... N83-25472 #
CONF-820814 ..... N83-24606 #
CONF-820814-2 ..... N83-24819* #
CONF-820814-8 ..... N83-25147 #
CONF-820814-12 ..... N83-24822 #
CONF-820814-28 ..... N83-25156 #
CONF-820827-6 ..... N83-25157 #
CONF-820827-7 ..... N83-25160 #
CONF-820827-8 ..... N83-25161 #
CONF-820827-9 ..... N83-25162 #
CONF-820827-10 ..... N83-24704 #
CONF-820827-12 ..... N83-24735 #
CONF-820827-13 ..... N83-25158 #
CONF-820827-14 ..... N83-25159 #
CONF-820827-15 ..... N83-24791 #
CONF-820827-16 ..... N83-25163 #
CONF-820827-17 ..... N83-25164 #
CONF-820833-8 ..... N83-24593 #
CONF-820834-1 ..... N83-25155 #
CONF-820834-2 ..... N83-25262 #
CONF-820840-1 ..... N83-24605 #
CONF-820840-2 ..... N83-24604 #
CONF-820846-1 ..... N83-25606 #
CONF-820846-2 ..... N83-24681 #
CONF-820848-1 ..... N83-25580 #
CONF-820849-2 ..... N83-25165 #
CONF-820852-1 ..... N83-25139 #
CONF-820852-2 ..... N83-25423 #
CONF-820853-1 ..... N83-25520 #
CONF-820853-3 ..... N83-25517 #
CONF-820854-10 ..... N83-24607 #
CONF-820855-1 ..... N83-25516 #
CONF-820855-6 ..... N83-25523 #
CONF-820863-1 ..... N83-25510 #
CONF-820908-3 ..... N83-25384 #
CONF-820909-5 ..... N83-24623 #
CONF-820926-3 ..... N83-24872 #
CONF-820928-1 ..... N83-25135 #
CONF-820928-3 ..... N83-25134 #
CONF-820930-4 ..... N83-25567 #
CONF-820930-8 ..... N83-25581 #
CONF-820930-10 ..... N83-25570 #
CONF-820933-1 ..... N83-25533 #
CONF-820936-2 ..... N83-25225 #
CONF-820937-1 ..... N83-25604 #
CONF-820937-3 ..... N83-24852 #
CONF-820940-2 ..... N83-25143 #
CONF-820942-2 ..... N83-25512 #
CONF-821001-1 ..... N83-25142 #
CONF-821002-2 ..... N83-25424 #
CONF-821002-3 ..... N83-25429 #
CONF-821003-1 ..... N83-24867 #
CONF-821006-2 ..... N83-25471 #
CONF-821007-2 ..... N83-25146 #
CONF-821007-3 ..... N83-24866 #
CONF-821013-2 ..... N83-24851 #
CONF-821014-1 ..... N83-25616 #
CONF-821016-1 ..... N83-24850 #
CONF-821019-1 ..... N83-24916 #
CONF-821020-1 ..... N83-25504 #
CONF-821021-1 ..... N83-25483 #
CONF-821023-1 ..... N83-24568 #
CONF-821026-1 ..... N83-24722 #
CONF-821106-5 ..... N83-24603 #
CONF-8106131 ..... N83-25223 #
CONF-8110176 ..... N83-25192 #
CONF-8205107-1 ..... N83-25227 #
CONF-8205113-1 ..... N83-25563* #
CONF-8206103-1 ..... N83-25620 #
CONF-8206104-1 ..... N83-24678 #
CONF-8206110-1 ..... N83-25509 #
CONF-8206115-1 ..... N83-24680 #

COO-2119-25 ..... N83-25612 #
COO-2382-0085 ..... N83-25422 #

CRREL-82-37 ..... N83-25011 #

CU-ME-F-2-82 ..... N83-24809 #

CUED/A-TURBO/TR-119 ..... N83-24859 #

CUMER-82-6 ..... N83-24817 #

C81-458.4/501 ..... N83-25596 #

DC-46 ..... N83-25488 #
DC-50 ..... N83-24782 #

DE82-001912 ..... N83-25193 #
DE82-005668 ..... N83-24676 #
DE82-005691 ..... N83-25226 #
DE82-005772 ..... N83-25194 #
DE82-006143 ..... N83-25013 #
DE82-006282 ..... N83-25142 #
DE82-006846 ..... N83-24679 #
DE82-007727 ..... N83-24724 #
DE82-007728 ..... N83-24912 #
DE82-007791 ..... N83-25508 #
DE82-008213 ..... N83-25187 #
DE82-008764 ..... N83-24610 #
DE82-008944 ..... N83-25534 #
DE82-009034 ..... N83-24591 #
DE82-009141 ..... N83-24677 #
DE82-009487 ..... N83-25196 #
DE82-009619 ..... N83-24838 #
DE82-009640 ..... N83-25015 #
DE82-009646 ..... N83-25016 #
DE82-009647 ..... N83-25017 #
DE82-009655 ..... N83-24734 #
DE82-009721 ..... N83-25197 #
DE82-009791 ..... N83-24592 #
DE82-010058 ..... N83-25195 #
DE82-010062 ..... N83-25558 #
DE82-010447 ..... N83-24594 #
DE82-011012 ..... N83-25231 #
DE82-011041 ..... N83-25014 #
DE82-011435 ..... N83-24913 #
DE82-011468 ..... N83-25626 #
DE82-011870 ..... N83-24622 #
DE82-011932 ..... N83-25192 #
DE82-012060 ..... N83-25189 #
DE82-012255 ..... N83-24624 #
DE82-012372 ..... N83-25021 #
DE82-012700 ..... N83-25047 #
DE82-012701 ..... N83-24867 #
DE82-012778 ..... N83-24787 #
DE82-012798 ..... N83-25535 #
DE82-013339 ..... N83-25191 #
DE82-013350 ..... N83-25367 #
DE82-013863 ..... N83-24627 #
DE82-014069 ..... N83-24819* #
DE82-014199 ..... N83-25150 #
DE82-014846 ..... N83-25527 #
DE82-014855 ..... N83-25528 #
DE82-014980 ..... N83-24825 #
DE82-015170 ..... N83-24847 #
DE82-015173 ..... N83-25376 #
DE82-015188 ..... N83-25471 #
DE82-015422 ..... N83-24628 #
DE82-015445 ..... N83-24822 #
DE82-015600 ..... N83-25151 #
DE82-015628 ..... N83-24618 #
DE82-015685 ..... N83-25470 #
DE82-015769 ..... N83-25568 #
DE82-015832 ..... N83-25531 #
DE82-016073 ..... N83-25147 #
DE82-016255 ..... N83-25532 #
DE82-016282 ..... N83-25149 #
DE82-016331 ..... N83-25604 #
DE82-016339 ..... N83-25185 #
DE82-016384 ..... N83-24623 #
DE82-016652 ..... N83-25138 #
DE82-016779 ..... N83-25259 #
DE82-016787 ..... N83-25146 #
DE82-016914 ..... N83-25219 #
DE82-016945 ..... N83-25018 #
DE82-017040 ..... N83-25180 #
DE82-017041 ..... N83-25179 #
DE82-017044 ..... N83-25227 #
DE82-017047 ..... N83-25181 #
DE82-017071 ..... N83-24866 #
DE82-017279 ..... N83-25186 #
DE82-017294 ..... N83-24850 #
DE82-017388 ..... N83-25618 #
DE82-017577 ..... N83-25184 #
DE82-017586 ..... N83-24851 #
DE82-017671 ..... N83-24739 #
DE82-017778 ..... N83-25148 #
DE82-018107 ..... N83-25567 #
DE82-018163 ..... N83-25260 #
DE82-018263 ..... N83-25524 #
DE82-018265 ..... N83-25473 #
DE82-018376 ..... N83-25616 #
DE82-018444 ..... N83-25153 #
DE82-018727 ..... N83-24716 #
DE82-018973 ..... N83-24916 #
DE82-019108 ..... N83-24568 #
DE82-019128 ..... N83-25333 #
DE82-019184 ..... N83-24871 #
DE82-019204 ..... N83-25620 #
DE82-019206 ..... N83-24678 #
DE82-019244 ..... N83-25504 #
DE82-019255 ..... N83-25135 #
DE82-019298 ..... N83-24609 #
DE82-019299 ..... N83-25572 #
DE82-019302 ..... N83-25606 #
DE82-019344 ..... N83-25190 #
DE82-019349 ..... N83-25605 #
DE82-019424 ..... N83-24625 #
DE82-019469 ..... N83-24593 #
DE82-019487 ..... N83-25603 #
DE82-019534 ..... N83-25155 #
DE82-019536 ..... N83-25563* #
DE82-019551 ..... N83-25533 #
DE82-019554 ..... N83-25262 #
DE82-019559 ..... N83-25424 #
DE82-019576 ..... N83-25483 #
DE82-019722 ..... N83-24621 #
DE82-019768 ..... N83-25144 #
DE82-019835 ..... N83-24601 #
DE82-019935 ..... N83-25261 #
DE82-019939 ..... N83-25635 #
DE82-020002 ..... N83-24790 #
DE82-020003 ..... N83-24688 #
DE82-020005 ..... N83-25183 #
DE82-020046 ..... N83-25559 #
DE82-020050 ..... N83-25154 #
DE82-020066 ..... N83-25188 #
DE82-020067 ..... N83-25509 #
DE82-020098 ..... N83-24865 #
DE82-020141 ..... N83-25607 #
DE82-020146 ..... N83-25494 #
DE82-020158 ..... N83-24614 #
DE82-020160 ..... N83-24605 #
DE82-020162 ..... N83-24854 #
DE82-020163 ..... N83-25578 #
DE82-020164 ..... N83-24604 #
DE82-020165 ..... N83-25573 #
DE82-020169 ..... N83-24849 #
DE82-020174 ..... N83-25429 #
DE82-020176 ..... N83-25530 #
DE82-020183 ..... N83-25602 #
DE82-020246 ..... N83-24720 #
DE82-020267 ..... N83-25514 #
DE82-020283 ..... N83-25581 #
DE82-020294 ..... N83-25511 #
DE82-020350 ..... N83-25580 #
DE82-020351 ..... N83-25225 #
DE82-020352 ..... N83-25570 #
DE82-020353 ..... N83-24722 #
DE82-020356 ..... N83-25139 #
DE82-020358 ..... N83-24917 #
DE82-020370 ..... N83-25521 #
DE82-020457 ..... N83-25140 #
DE82-020477 ..... N83-25571 #
DE82-020482 ..... N83-24629 #
DE82-020496 ..... N83-24706 #
DE82-020497 ..... N83-25513 #
DE82-020501 ..... N83-24683 #
DE82-020517 ..... N83-24599 #
DE82-020517 ..... N83-25495 #

DE82-020519 ..... N83-24852 #
DE82-020535 ..... N83-25145 #
DE82-020549 ..... N83-25576 #
DE82-020600 ..... N83-25132 #
DE82-020610 ..... N83-25582 #
DE82-020612 ..... N83-25334 #
DE82-020626 ..... N83-25423 #
DE82-020641 ..... N83-24872 #
DE82-020736 ..... N83-24606 #
DE82-020741 ..... N83-25510 #
DE82-020752 ..... N83-24721 #
DE82-020753 ..... N83-24613 #
DE82-020758 ..... N83-24612 #
DE82-020760 ..... N83-24611 #
DE82-020775 ..... N83-24607 #
DE82-020799 ..... N83-24619 #
DE82-020803 ..... N83-25422 #
DE82-020804 ..... N83-24735 #
DE82-020805 ..... N83-25516 #
DE82-020810 ..... N83-25165 #
DE82-020817 ..... N83-25163 #
DE82-020818 ..... N83-25164 #
DE82-020823 ..... N83-25157 #
DE82-020824 ..... N83-25520 #
DE82-020825 ..... N83-25161 #
DE82-020826 ..... N83-25162 #
DE82-020827 ..... N83-24704 #
DE82-020831 ..... N83-24606 #
DE82-020832 ..... N83-25517 #
DE82-020838 ..... N83-24791 #
DE82-020839 ..... N83-25159 #
DE82-020840 ..... N83-25158 #
DE82-020851 ..... N83-24685 #
DE82-020853 ..... N83-24615 #
DE82-020858 ..... N83-24689 #
DE82-020859 ..... N83-24603 #
DE82-020864 ..... N83-25512 #
DE82-020881 ..... N83-24620 #
DE82-020884 ..... N83-25474 #
DE82-020886 ..... N83-24557 #
DE82-020894 ..... N83-25160 #
DE82-020909 ..... N83-25472 #
DE82-020931 ..... N83-24681 #
DE82-021106 ..... N83-24821 #
DE82-021126 ..... N83-25385 #
DE82-021146 ..... N83-25131 #
DE82-021179 ..... N83-24598 #
DE82-021234 ..... N83-25421 #
DE82-021266 ..... N83-25137 #
DE82-021272 ..... N83-25136 #
DE82-021276 ..... N83-24597 #
DE82-021338 ..... N83-25141 #
DE82-021387 ..... N83-24602 #
DE82-021543 ..... N83-24680 #
DE82-021549 ..... N83-25518 #
DE82-021551 ..... N83-25583 #
DE82-021559 ..... N83-25228 #
DE82-021572 ..... N83-25383 #
DE82-021685 ..... N83-24762 #
DE82-021687 ..... N83-24788 #
DE82-021690 ..... N83-25577 #
DE82-021691 ..... N83-25574 #
DE82-021695 ..... N83-25579 #
DE82-021760 ..... N83-25143 #
DE82-021769 ..... N83-25384 #
DE82-021833 ..... N83-25529 #
DE82-021836 ..... N83-25420 #
DE82-021843 ..... N83-24705 #
DE82-021844 ..... N83-25515 #
DE82-021880 ..... N83-24853 #
DE82-021903 ..... N83-24686 #
DE82-021918 ..... N83-24738 #
DE82-021926 ..... N83-24848 #
DE82-021943 ..... N83-24684 #
DE82-021948 ..... N83-25425 #
DE82-021953 ..... N83-24840 #
DE82-022006 ..... N83-25608 #
DE82-022038 ..... N83-25134 #
DE82-022057 ..... N83-24682 #
DE82-022078 ..... N83-24736 #
DE82-022155 ..... N83-25569 #
DE82-022305 ..... N83-25258 #
DE82-022505 ..... N83-24589 #
DE82-902072 ..... N83-24737 #
DE82-902098 ..... N83-25419 #
DE82-904594 ..... N83-24826 #
DE82-904603 ..... N83-24690 #
DE82-905281 ..... N83-25152 #
DE82-905283 ..... N83-24914 #
DE82-905367 ..... N83-24626 #
DE82-905772 ..... N83-25182 #
DE82-905815 ..... N83-25490 #
DE82-905834 ..... N83-24918 #
DE82-906466 ..... N83-25621 #
DE83-000101 ..... N83-24596 #
DE83-000110 ..... N83-25133 #
DE83-000241 ..... N83-25519 #
DE83-000309 ..... N83-24600 #
DE83-000398 ..... N83-24719 #
DE83-000658 ..... N83-24595 #
DE83-000936 ..... N83-25216 #
DE83-001378 ..... N83-25122 #
DE83-001841 ..... N83-24718 #
DE83-002597 ..... N83-25566 #
DE83-002948 ..... N83-25129 #
DE83-003140 ..... N83-25210 #
DE83-003316 ..... N83-25128 #
DE83-003611 ..... N83-24630 #
DE83-003713 ..... N83-25601 #
DE83-003802 ..... N83-25115 #
DE83-003804 ..... N83-24617 #
DE83-003822 ..... N83-24820 #
DE83-003888 ..... N83-25232 #
DE83-003890 ..... N83-25368 #
DE83-004036 ..... N83-25263 #
DE83-004044 ..... N83-24933 #
DE83-004048 ..... N83-25233 #
DE83-004050 ..... N83-25522 #
DE83-004051 ..... N83-25234 #
DE83-004063 ..... N83-25609 #
DE83-004107 ..... N83-25203 #
DE83-004109 ..... N83-25204 #
DE83-004174 ..... N83-25264 #
DE83-004483 ..... N83-25022 #
DE83-004488 ..... N83-25565 #
DE83-004523 ..... N83-25611 #
DE83-004528 ..... N83-25475 #
DE83-004560 ..... N83-25523 #
DE83-004641 ..... N83-25023 #
DE83-004753 ..... N83-25127 #
DE83-004775 ..... N83-25209 #
DE83-004813 ..... N83-25610 #
DE83-004868 ..... N83-25235 #
DE83-004869 ..... N83-24590 #
DE83-004875 ..... N83-25119 #
DE83-004876 ..... N83-25214 #
DE83-004877 ..... N83-25120 #
DE83-004878 ..... N83-24554 #
DE83-004879 ..... N83-25205 #
DE83-004880 ..... N83-25206 #
DE83-004881 ..... N83-25207 #
DE83-004882 ..... N83-25208 #
DE83-004912 ..... N83-25230 #
DE83-004924 ..... N83-24692 #
DE83-004942 ..... N83-24632 #
DE83-004944 ..... N83-24570 #
DE83-005022 ..... N83-24631 #
DE83-005024 ..... N83-24792 #
DE83-005025 ..... N83-24793 #
DE83-005029 ..... N83-24709 #
DE83-005048 ..... N83-25215 #
DE83-005083 ..... N83-25211 #
DE83-005136 ..... N83-25237 #
DE83-005168 ..... N83-24827 #
DE83-005174 ..... N83-24823 #
DE83-005189 ..... N83-25123 #
DE83-005212 ..... N83-24633 #
DE83-005232 ..... N83-24707 #
DE83-005244 ..... N83-25168 #
DE83-005246 ..... N83-25169 #
DE83-005251 ..... N83-24824 #
DE83-005269 ..... N83-25170 #
DE83-005270 ..... N83-25124 #
DE83-005283 ..... N83-25612 #
DE83-005287 ..... N83-25177 #
DE83-005288 ..... N83-25175 #
DE83-005327 ..... N83-25427 #
DE83-005330 ..... N83-24708 #
DE83-005360 ..... N83-25426 #
DE83-005361 ..... N83-25171 #
DE83-005363 ..... N83-24839 #
DE83-005364 ..... N83-24486 #
DE83-005365 ..... N83-25172 #
DE83-005377 ..... N83-25130 #
DE83-005379 ..... N83-25173 #
DE83-005380 ..... N83-25174 #
DE83-005381 ..... N83-25202 #
DE83-005382 ..... N83-25176 #
DE83-005383 ..... N83-24693 #
DE83-005412 ..... N83-25019 #
DE83-005416 ..... N83-24789 #
DE83-005441 ..... N83-25575 #
DE83-005454 ..... N83-24717 #
DE83-005456 ..... N83-25335 #
DE83-005488 ..... N83-25584 #
DE83-005489 ..... N83-25167 #
DE83-005529 ..... N83-25178 #
DE83-005564 ..... N83-24915 #
DE83-005604 ..... N83-25336 #
DE83-005635 ..... N83-25536 #
DE83-005654 ..... N83-25125 #
DE83-005655 ..... N83-25126 #
DE83-005692 ..... N83-24687 #
DE83-005706 ..... N83-24589 #
DE83-005711 ..... N83-25224 #
DE83-005727 ..... N83-25201 #
DE83-005728 ..... N83-25050 #
DE83-005729 ..... N83-25200 #
DE83-005730 ..... N83-25166 #
DE83-005812 ..... N83-25619 #
DE83-005828 ..... N83-24723 #
DE83-005902 ..... N83-24919 #
DE83-005935 ..... N83-25560 #
DE83-005976 ..... N83-25585 #
DE83-005993 ..... N83-25229 #
DE83-006357 ..... N83-24648 #
DE83-006814 ..... N83-25332 #
DE83-008177 ..... N83-24911 #
DE83-019033 ..... N83-24868 #
DE83-020773 ..... N83-25156 #
DE83-900751 ..... N83-24616 #
DE83-900754 ..... N83-25418 #
DE83-900757 ..... N83-25199 #
DE83-900758 ..... N83-25198 #
DE83-900849 ..... N83-24691 #
DE83-900876 ..... N83-25213 #
DE83-900880 ..... N83-24726 #
DE83-900881 ..... N83-24725 #
DE83-900882 ..... N83-25212 #
DE83-900987 ..... N83-25121 #
DE83-900991 ..... N83-24675 #
DE83-900993 ..... N83-24786 #
DE83-901050 ..... N83-25012 #
DE83-901079 ..... N83-25236 #
DE83-901096 ..... N83-24873 #
DE83-901108 ..... N83-24870 #
DE83-901141 ..... N83-25020 #

DFVLR-FB-78-23 ..... N83-24480 #

DGS-334 ..... N83-25413* #
DGS-339 ..... N83-25469 #

DNA-TR-81-48 ..... N83-25554 #

DOE/AF-92017/T2 ..... N83-24716 #

DOE/BC-10430/1 ..... N83-24719 #

DOE/BETC/QPR-82/1 ..... N83-25183 #

DOE/CH-10122/9 ..... N83-25204 #

DOE/CS-40337/2 ..... N83-25125 #
DOE/CS-40337/6 ..... N83-25211 #
DOE/CS-40377/1 ..... N83-25126 #
DOE/CS-50026/1 ..... N83-24721 #
DOE/CS-83001/T1 ..... N83-24630 #

DOE/DP-40045/1 ..... N83-24848 #
DOE/DP-40163/1 ..... N83-25565 #

DOE/EP-0037 ..... N83-25221 #
DOE/EP-0079 ..... N83-24717 #
DOE/EP-0080 ..... N83-25124 #

DOE/ER-0045/9 ..... N83-24648 #
DOE/ER-0123 ..... N83-25056 #
DOE/ER-0150 ..... N83-25210 #
DOE/ER-01198/1387 ..... N83-25607 #
DOE/ER-01198/1396 ..... N83-24707 #
DOE/ER-02119/25 ..... N83-25612 #
DOE/ER-02203/T1 ..... N83-25559 #
DOE/ER-02383/0085 ..... N83-25422 #
DOE/ER-02408/210 ..... N83-25523 #
DOE/ER-02945/5 ..... N83-24594 #
DOE/ER-04461/5 ..... N83-24677 #
DOE/ER-05002/28 ..... N83-25608 #
DOE/ER-10428/2 ..... N83-25610 #
DOE/ER-10435/2 ..... N83-24590 #
DOE/ER-10454/T1 ..... N83-25519 #
DOE/ER-10554/24 ..... N83-24612 #
DOE/ER-10554/25 ..... N83-24613 #
DOE/ER-10554/99-REV-1 ..... N83-24611 #
DOE/ER-10556/92 ..... N83-25609 #
DOE/ER-10910/02 ..... N83-24691 #
DOE/ER-10970/1 ..... N83-24619 #
DOE/ER-12064/1 ..... N83-25611 #
DOE/ER-30015/T1 ..... N83-24618 #
DOE/ER-40048/10N2 ..... N83-25494 #
DOE/ER-60055/1 ..... N83-24617 #
DOE/ER-60104/1 ..... N83-25332 #

DOE/ET-10112/T1 ..... N83-24601 #
DOE/ET-10152/T11-VOL-2 ..... N83-25187 #
DOE/ET-10154/110 ..... N83-25133 #
DOE/ET-10261/T5-VOL-4 ..... N83-25231 #
DOE/ET-10615/17 ..... N83-25179 #

DOE/ET-10615/17-APP-8A ..... N83-25180 #
DOE/ET-10615/17-APP-8B ..... N83-25181 #
DOE/ET-10693/2295 ..... N83-24596 #
DOE/ET-10815/63 ..... N83-24589 #
DOE/ET-11029/1191 ..... N83-24628 #
DOE/ET-11423/T3 ..... N83-24622 #
DOE/ET-11423/T5 ..... N83-24597 #
DOE/ET-12581/T1 ..... N83-25145 #
DOE/ET-14752/28 ..... N83-25141 #
DOE/ET-20279/162 ..... N83-25053 #
DOE/ET-20279/180-VOL-5 ..... N83-25169 #
DOE/ET-20279/182 ..... N83-25055 #
DOE/ET-20279/184 ..... N83-25054 #
DOE/ET-20279/185 ..... N83-25052 #
DOE/ET-20651/T2 ..... N83-25122 #
DOE/ET-51013/51 ..... N83-25577 #
DOE/ET-51013/59 ..... N83-25575 #

DOE/EV-03018/T5 ..... N83-24609 #
DOE/EV-10019/02-VOL-2-PT-1 ..... N83-25222 #
DOE/EV-10049/1 ..... N83-25237 #
DOE/EV-10611/2 ..... N83-25235 #
DOE/EV-10659/T1 ..... N83-24739 #
DOE/EV-71024/49 ..... N83-25230 #

DOE/FC-10281/1 ..... N83-24615 #

DOE/ID-01745/T1 ..... N83-25228 #
DOE/ID-12030/T3 ..... N83-25023 #
DOE/ID-12079/57 ..... N83-25261 #
DOE/ID-12079/86 ..... N83-25263 #

DOE/JPL-1012/81 ..... N83-25034* #
DOE/JPL-954373-81/19 ..... N83-25027* #

DOE/MC-16024/T3 ..... N83-24598 #
DOE/MC-16463/T5 ..... N83-25258 #
DOE/MC-16463/1324 ..... N83-25019 #
DOE/MC-19170/1168 ..... N83-25219 #

DOE/METC-82/24 ..... N83-25186 #

DOE/NASA/0011-1 ..... N83-24857* #
DOE/NASA/12726-21 ..... N83-25042* #
DOE/NASA/20485-15 ..... N83-25041* #
DOE/NASA/51040-46 ..... N83-24505* #

DOE/NBM-2020246 ..... N83-24720 #

DOE/OR-03054/T11 ..... N83-24627 #

DOE/PC-30041/T8 ..... N83-24624 #
DOE/PC-30075/10 ..... N83-24625 #
DOE/PC-30293/7 ..... N83-24599 #
DOE/PC-40005/20 ..... N83-24600 #
DOE/PC-40265/5 ..... N83-24602 #
DOE/PC-40785/4 ..... N83-24608 #

DOE/RA-23211/4 ..... N83-25127 #
DOE/RA-50076/1 ..... N83-25119 #
DOE/RA-50076/2 ..... N83-25214 #
DOE/RA-50076/3 ..... N83-25120 #
DOE/RA-50076/4 ..... N83-24554 #
DOE/RA-50076/5 ..... N83-25205 #
DOE/RA-50076/6 ..... N83-25206 #
DOE/RA-50076/7 ..... N83-25208 #
DOE/RA-50076/8 ..... N83-25207 #
DOE/RA-50076/14 ..... N83-25177 #
DOE/RA-50076/15 ..... N83-25175 #
DOE/RA-50552/1220 ..... N83-25184 #
DOE/RA-50552/1220-VOL-2 ..... N83-25185 #

DOE/R5-10251/T1 ..... N83-25138 #
DOE/R5-10252/2 ..... N83-25170 #
DOE/R5-10333/3 ..... N83-25123 #

DOE/SF-11429/1 ..... N83-25209 #

DOT/FAA/EE-82/16 ..... N83-25500 #

DOT/FAA/PM-83/18 ..... N83-24492 #

DP-MS-82-76 ..... N83-24692 #

DPSPU-81-30-18 ..... N83-24865 #

DRIC-BR-86369 ..... N83-25503 #

DRL-58-DRD-SE-7 ..... N83-25027* #

DTNSRDC-ASED-CR-2-83 ..... N83-24809 #

D6-51762-3 ..... N83-24479* #

E-1122 ..... N83-24695* #
E-1156 ..... N83-24641* #
E-1179 ..... N83-24509* #
E-1227 ..... N83-24640* #
E-1300 ..... N83-24862* #
E-1311 ..... N83-24575* #
E-1388 ..... N83-24634* #
E-1401 ..... N83-24875* #
E-1421-3 ..... N83-25625* #
E-1435 ..... N83-25036* #
E-1436 ..... N83-24636* #
E-1524 ..... N83-24874* #
E-1535 ..... N83-24552* #
E-1549 ..... N83-25037* #
E-1562 ..... N83-24559* #
E-1592 ..... N83-24637* #
E-1595 ..... N83-24487* #
E-1601 ..... N83-24858* #
E-1605 ..... N83-24506* #
E-1609 ..... N83-24635* #
E-1612 ..... N83-24638* #
E-1614 ..... N83-24856* #
E-1616 ..... N83-24855* #
E-1621 ..... N83-24505* #
E-1642 ..... N83-25041* #
E-1643 ..... N83-25038* #
E-1644 ..... N83-24467* #
E-1649 ..... N83-24798* #
E-1662 ..... N83-25042* #
E-1663 ..... N83-24571* #
E-1665 ..... N83-25499* #
E-1667 ..... N83-24764* #
E-1673 ..... N83-24799* #
E-1692 ..... N83-24470* #

EECE-275(83)-NASA-931-1 ..... N83-25039* #

EGG-1183-1836 ..... N83-25635 #
EGG-2151 ..... N83-25018 #

EMM-TM-82-2 ..... N83-25125 #

ENICO-1106 ..... N83-24610 #

EPRI-AP-2216 ..... N83-24626 #
EPRI-AP-2456 ..... N83-25152 #
EPRI-AP-2737 ..... N83-24675 #

EPRI-CS-2452 ..... N83-25182 #
EPRI-CS-2783 ..... N83-25020 #

EPRI-EL-2757 ..... N83-24786 #

EPRI-EM-2351-VOL-6 ..... N83-25200 #
EPRI-EM-2351-VOL-7 ..... N83-25050 #
EPRI-EM-2351-VOL-8 ..... N83-25166 #
EPRI-EM-2351-VOL-9 ..... N83-25201 #
EPRI-EM-2695-VOL-1 ..... N83-25198 #
EPRI-EM-2695-VOL-2 ..... N83-25199 #
EPRI-EM-2780 ..... N83-25121 #

EPRI-NP-2229 ..... N83-25419 #
EPRI-NP-2239-VOL-2 ..... N83-24737 #
EPRI-NP-2429-VOL-2 ..... N83-24918 #
EPRI-NP-2440 ..... N83-24914 #
EPRI-NP-2507 ..... N83-25490 #
EPRI-NP-2530 ..... N83-25621 #
EPRI-NP-2661 ..... N83-24873 #
EPRI-NP-2701 ..... N83-24316 #
EPRI-NP-2709-CCM-VOL-1 ..... N83-25418 #
EPRI-NP-2736 ..... N83-24870 #

ERIM-161800-1-F ..... N83-25024* #
ERIM-170400-3-F ..... N83-25546 #

ESA-TT-583 ..... N83-24480 #
ESA-TT-761 ..... N83-25243 #

ESD-TR-82-084 ..... N83-24779 #
ESD-TR-82-086 ..... N83-25592 #
ESD-TR-82-099 ..... N83-25254 #
ESD-TR-82-104 ..... N83-24745 #

ESL-70 ..... N83-25261 #
ESL-711984-7 ..... N83-24744 #
ESL-713603-7 ..... N83-24743 #

ETI-CR-82-1081 ..... N83-25554 #

ETL-0292 ..... N83-25009 #
ETL-0300 ..... N83-25008 #
ETL-0301 ..... N83-25617 #
ETL-0305 ..... N83-25007 #
ETL-0308 ..... N83-25244 #

E83-10289 ..... N83-25024* #
E83-10290 ..... N83-24994* #
E83-10291 ..... N83-24995* #
E83-10293 ..... N83-24996* #
E83-10294 ..... N83-24997* #
E83-10295 ..... N83-24998* #
E83-10296 ..... N83-24999* #
E83-10297 ..... N83-25000* #
E83-10298 ..... N83-25001* #
E83-10299 ..... N83-25002* #
E83-10300 ..... N83-24993*

FAA-AM-82-10 ..... N83-25357 #

FAA-AP-83-1 ..... N83-24493 #

FAA-ASF-200-83-1 ..... N83-24499 #

FAA-CT-82-118 ..... N83-24489 #
FAA-CT-82-153 ..... N83-24495 #
FAA-CT-83-1 ..... N83-24805 #
FAA-CT-83-23 ..... N83-24488* #

FAA-EE-82-18 ..... N83-25648 #

FAA-PM-83-4 ..... N83-24491 #
FAA-PM-83-16 ..... N83-24742 #
FAA-PM-83-19-REV-A ..... N83-24494 #

FAA-RD-82-85 ..... N83-24495 #

FE-MIT-2295T26 ..... N83-24596 #

FE-2030-17 ..... N83-25179 #
FE-2030-17-APP-8A ..... N83-25180 #
FE-2030-17-APP-8B ..... N83-25181 #
FE-2433-27-VOL-4 ..... N83-25231 #
FE-2547-46-VOL-2 ..... N83-25187 #
FE-2676-8 ..... N83-24601 #

FERMILAB/TM-1125 ..... N83-24736 #

FR.341.03.0181 ..... N83-24742 #

FR-3 ..... N83-25364 #
FR-227 ..... N83-24482 #

FRI018 ..... N83-25379* #

FWD82-4284A ..... N83-24749 #

FWS-7621 ..... N83-24516* #

G-F4507 ..... N83-25000* #

G-83F0183 ..... N83-24545* #

GA-A16493 ..... N83-24723 #

GAO/MASAD-83-11 ..... N83-25220 #

GAO/RCED-83-106 ..... N83-25624 #

GDC-ASP-83-006 ..... N83-24527* #
GDC-ASP-83-007 ..... N83-24526* #

GEFR-SP-260 ..... N83-24913 #

GJBX-99-82-VOL-1 ..... N83-25014 #
GJBX-99-82-VOL-2 ..... N83-25015 #
GJBX-99-82-VOL-3 ..... N83-25016 #
GJBX-99-82-VOL-4 ..... N83-25017 #
GJBX-171-82 ..... N83-25022 #

HDL-CR-82-116-3 ..... N83-24755 #

HDL-TL-83-1 ..... N83-24776 #

HEDL-SA-2554-FP ..... N83-24683 #
HEDL-SA-2650 ..... N83-24872 #

HONEYWELL-83SRC22 ..... N83-25040* #

HSS-B-092 ..... N83-25327 #

IAEA-CN-41 ..... N83-25581 #

IDA-P-1661 ..... N83-24751 #

IDA/HQ-82-24518 ..... N83-24751 #

IDO-10099-VOL-2 ..... N83-25149 #

INDU/DC/GMH/TR-83/52 ..... N83-24585 #

INDU/DC/TR-83/1-MC ..... N83-24581 #

INPE-1693-RPE/120 ..... N83-25242 #
INPE-2227-MD/014 ..... N83-25002* #

INPE-2565-MD/020-PT-2 ..... N83-25613 #
INPE-2577-PRE/225 ..... N83-24994* #
INPE-2605-MD/021 ..... N83-25319 #
INPE-2607-NTE/194 ..... N83-24770 #
INPE-2608-TDL/105 ..... N83-24530 #
INPE-2613-NTE/195 ..... N83-25390 #
INPE-2614-NTE/196 ..... N83-25391 #
INPE-2617-TDL/106 ..... N83-25643 #
INPE-2620-TDL/107 ..... N83-25614 #
INPE-2621-RPE/425 ..... N83-24993*
INPE-2625-NTE/197 ..... N83-25004 #
INPE-2628-TDL/111 ..... N83-25316 #
INPE-2631-PRE/258 ..... N83-25642 #
INPE-2633-RPE/426 ..... N83-25239 #
INPE-2634-RPE-427 ..... N83-25389 #
INPE-2672-PRE/281 ..... N83-25644 #
INPE-2690-PRE/289 ..... N83-25633 #
INPE-2692-PRE/290 ..... N83-25632 #
INPE-2696-PRE/293 ..... N83-25001* #
INPE-2709-PRE/297 ..... N83-25005 #
INPE-2710-PRE/298 ..... N83-25437 #
INPE-2714-RPE/431 ..... N83-24907 #

IR-2 ..... N83-24863 #

IRIG-104-63-PT-1 ..... N83-25255 #

IS-M-382 ..... N83-24623 #

ISSN-0077-5606 ..... N83-24574 #
ISSN-0170-1339 ..... N83-24522 #
ISSN-0309-6521 ..... N83-24859 #
ISSN-0347-0881 ..... N83-25048 #
ISSN-0347-0881 ..... N83-25241 #
ISSN-0349-3571 ..... N83-25240 #
ISSN-0374-2784 ..... N83-24908 #
ISSN-0381-0010 ..... N83-24475 #
ISSN-0389-0010 ..... N83-24476 #
ISSN-0389-0010 ..... N83-24861 #
ISSN-0389-4010 ..... N83-24477 #
ISSN-0389-4010 ..... N83-24508 #
ISSN-0389-4010 ..... N83-24514 #
ISSN-0389-4010 ..... N83-24533 #
ISSN-0389-4010 ..... N83-24534 #
ISSN-0389-4010 ..... N83-24807 #
ISSN-0389-4010 ..... N83-24832 #
ISSN-0389-4010 ..... N83-24860 #
ISSN-0436-1199 ..... N83-25506 #

JPL-PUB-33-13 ..... N83-25034* #

JPL-PUBL-82-62 ..... N83-24710* #
JPL-PUBL-82-80 ..... N83-24711* #

JPL-9950-797 ..... N83-25027* #

K/PS-5002 ..... N83-24593 #

K/UR-451 ..... N83-25022 #

KMSF-U-1088 ..... N83-24847 #

KU-FRL-417-21 ..... N83-25497* #
KU-FRL-582-1 ..... N83-24512* #

L-15486 ..... N83-24490* #
L-15507 ..... N83-24471* #
L-15516 ..... N83-24808* #
L-15554 ..... N83-25337* #
L-15557 ..... N83-24561* #
L-15562 ..... N83-25438* #
L-15570 ..... N83-24478* #
L-15588 ..... N83-24562* #
L-15596 ..... N83-25525* #

LA-TR-83-1 ..... N83-24793 #
LA-TR-83-2 ..... N83-24792 #

LA-UR-81-1054 ..... N83-24819* #
LA-UR-82-1192 ..... N83-25568 #
LA-UR-82-1270 ..... N83-24822 #
LA-UR-82-1273 ..... N83-25147 #
LA-UR-82-1706 ..... N83-25616 #
LA-UR-82-1867 ..... N83-24851 #
LA-UR-82-1893 ..... N83-25483 #
LA-UR-82-1971 ..... N83-25262 #
LA-UR-82-2059 ..... N83-25424 #
LA-UR-82-2147 ..... N83-25567 #
LA-UR-82-2262 ..... N83-25563* #
LA-UR-82-2269 ..... N83-25155 #
LA-UR-82-2281 ..... N83-25533 #
LA-UR-82-2326 ..... N83-25384 #
LA-UR-82-2374 ..... N83-24853 #
LA-UR-82-2496 ..... N83-25143 #

LA-9111-M ..... N83-25393 #

LA-9142-MS ..... N83-25534 #
LA-9205-MS ..... N83-25381 #
LA-9214-MS ..... N83-25380 #
LA-9353-M ..... N83-25420 #
LA-9420-T ..... N83-25515 #
LA-9447-T ..... N83-24705 #
LA-9476-PR ..... N83-25529 #
LA-9539-MS ..... N83-25368 #
LA-9543-MS ..... N83-25129 #
LA-9568-MS ..... N83-25232 #
LA-9601-MS ..... N83-25336 #

LBL-13238-REV ..... N83-24825 #
LBL-13405 ..... N83-25394 #
LBL-13600 ..... N83-24933 #
LBL-14067 ..... N83-24852 #
LBL-14164 ..... N83-25233 #
LBL-14215 ..... N83-25576 #
LBL-14304 ..... N83-25132 #
LBL-14391 ..... N83-25526 #
LBL-14400 ..... N83-25495 #
LBL-14467 ..... N83-25234 #
LBL-14496 ..... N83-25334 #
LBL-14528 ..... N83-25606 #
LBL-14641 ..... N83-25514 #
LBL-14658 ..... N83-25509 #
LBL-14683 ..... N83-25572 #
LBL-14686 ..... N83-25188 #
LBL-14714 ..... N83-25511 #
LBL-14749 ..... N83-24682 #
LBL-14763 ..... N83-25383 #
LBL-14800 ..... N83-25522 #
LBL-14923 ..... N83-25601 #

LC-82-23047 ..... N83-25349* #

LIDS-P-1263 ..... N83-25401 #

LMSC-D-059359 ..... N83-24727* #
LMSC-D-059404 ..... N83-24537* #

LR-30141 ..... N83-24488* #

M-TP-82-006-U ..... N83-24520 #

MAE-1570 ..... N83-24588 #

MANPA-476(82) ..... N83-24713 #

MAW-82-009-U ..... N83-24519 #

MBB/FE123/S/PUB/83 ..... N83-24518 #
MBB/FE123/S/STY/0042 ..... N83-24522 #

MC-TSR-2427 ..... N83-25462 #

MCR-82-1337 ..... N83-24544* #

MDC-E2548 ..... N83-24551* #
MDC-E2576 ..... N83-24550* #

MDC-Q0778 ..... N83-24646 #

MEC-13-W ..... N83-25341 #

MHSMP-82-33 ..... N83-24718 #

MLM-2804 ..... N83-24841 #
MLM-2891-OP ..... N83-24676 #
MLM-2908 ..... N83-25532 #
MLM-2938 ..... N83-25531 #
MLM-2971 ..... N83-24686 #
MLM-2987-OP ..... N83-24607 #
MLM-3033 ..... N83-25536 #

MML-TR-23C ..... N83-24703 #

MRC-TSR-2428 ..... N83-25476 #
MRC-TSR-2429 ..... N83-25453 #
MRC-TSR-2430 ..... N83-25440 #
MRC-TSR-2431 ..... N83-25464 #
MRC-TSR-2432 ..... N83-24810 #
MRC-TSR-2433 ..... N83-25449 #
MRC-TSR-2434 ..... N83-25321 #
MRC-TSR-2435 ..... N83-24813 #
MRC-TSR-2436 ..... N83-25482 #
MRC-TSR-2437 ..... N83-25452 #
MRC-TSR-2438 ..... N83-24812 #
MRC-TSR-2439 ..... N83-24811 #
MRC-TSR-2440 ..... N83-25448 #
MRC-TSR-2441 ..... N83-25441 #
MRC-TSR-2442 ..... N83-25446 #
MRC-TSR-2443 ..... N83-25444 #
MRC-TSR-2444 ..... N83-25445 #
MRC-TSR-2445 ..... N83-25443 #
MRC-TSR-2446 ..... N83-25439 #

MRC-TSR-2447 ..... N83-25447 #

MTR-82W59 ..... N83-25215 #

M82-10 ..... N83-24746 #

N-151871 ..... N83-24504* #

N/FE123/S/PUB/77 ..... N83-24517 #

NADC-82199-60 ..... N83-25353 #

NAEC-ENG-91-7999 ..... N83-24772 #

NAEC-92-164 ..... N83-24864 #

NAL-TR-717 ..... N83-24860 #
NAL-TR-741 ..... N83-24508 #
NAL-TR-743 ..... N83-24514 #
NAL-TR-744 ..... N83-24533 #
NAL-TR-746 ..... N83-24477 #
NAL-TR-747 ..... N83-24476 #
NAL-TR-748 ..... N83-24534 #
NAL-TR-749 ..... N83-24832 #
NAL-TR-750 ..... N83-24861 #
NAL-TR-751 ..... N83-24475 #

NAL-54-745 ..... N83-24807 #

NAS 1.15:77020 ..... N83-24555* #
NAS 1.15:77041 ..... N83-24528* #
NAS 1.15:77060 ..... N83-24573* #
NAS 1.15:80695 ..... N83-25000* #
NAS 1.15:82520 ..... N83-24553* #
NAS 1.15:82521 ..... N83-24830* #
NAS 1.15:82522 ..... N83-25268* #
NAS 1.15:82524 ..... N83-24539* #
NAS 1.15:82992 ..... N83-25625* #
NAS 1.15:82999 ..... N83-25036* #
NAS 1.15:83000 ..... N83-24636* #
NAS 1.15:83059 ..... N83-24874* #
NAS 1.15:83064 ..... N83-24552* #
NAS 1.15:83310 ..... N83-25037* #
NAS 1.15:83321 ..... N83-24559* #
NAS 1.15:83340 ..... N83-24487* #
NAS 1.15:83348 ..... N83-24506* #
NAS 1.15:83352 ..... N83-24634* #
NAS 1.15:83355 ..... N83-24638* #
NAS 1.15:83356 ..... N83-24855* #
NAS 1.15:83359 ..... N83-24505* #
NAS 1.15:83366 ..... N83-24875* #
NAS 1.15:83368 ..... N83-24635* #
NAS 1.15:83369 ..... N83-24637* #
NAS 1.15:83374 ..... N83-25041* #
NAS 1.15:83375 ..... N83-25038* #
NAS 1.15:83376 ..... N83-24467* #
NAS 1.15:83378 ..... N83-24798* #
NAS 1.15:83385 ..... N83-25042* #
NAS 1.15:83386 ..... N83-24571* #
NAS 1.15:83387 ..... N83-25499* #
NAS 1.15:83389 ..... N83-24858* #
NAS 1.15:83390 ..... N83-24764* #
NAS 1.15:83396 ..... N83-24799* #
NAS 1.15:83402 ..... N83-24856* #
NAS 1.15:83409 ..... N83-24470* #
NAS 1.15:84309 ..... N83-24473* #
NAS 1.15:84317 ..... N83-25003* #
NAS 1.15:84359 ..... N83-25630* #
NAS 1.15:84363 ..... N83-24472* #
NAS 1.15:84573 ..... N83-24471* #
NAS 1.15:84591 ..... N83-24542* #
NAS 1.15:84609 ..... N83-25337* #
NAS 1.15:84610 ..... N83-24490* #
NAS 1.15:84636 ..... N83-25525* #
NAS 1.15:84655 ..... N83-25650* #
NAS 1.15:84662 ..... N83-24794* #
NAS 1.15:84953 ..... N83-24545* #
NAS 1.15:85006 ..... N83-24995* #
NAS 1.15:85014 ..... N83-25639* #
NAS 1.15:85178 ..... N83-24997* #
NAS 1.15:85315 ..... N83-25629* #
NAS 1.15:85328 ..... N83-24771* #
NAS 1.15:85329 ..... N83-25269* #
NAS 1.21:447 ..... N83-25349* #
NAS 1.21:7011(241) N83-25347*
NAS 1.21:7037(160) N83-24466*
NAS 1.21:7043(36) N83-25025*
NAS 1.21:7046(07) N83-24525*
NAS 1.26:3642 ..... N83-24479* #
NAS 1.26:3688 ..... N83-24500* #
NAS 1.26:165540 ..... N83-24516* #
NAS 1.26:166063 ..... N83-24544* #
NAS 1.26:166089 ..... N83-24488* #
NAS 1.26:166097 ..... N83-25498* #
NAS 1.26:166099 ..... N83-24876* #
NAS 1.26:166105 ..... N83-24560* #

NAS 1.26:166112 ..... N83-25433* #
NAS 1.26:166113 ..... N83-25431* #
NAS 1.26:166114 ..... N83-24766* #
NAS 1.26:166115 ..... N83-25432* #
NAS 1.26:166116 ..... N83-25377* #
NAS 1.26:166117 ..... N83-25496* #
NAS 1.26:166118 ..... N83-24512* #
NAS 1.26:166478 ..... N83-25372* #
NAS 1.26:168141 ..... N83-25112* #
NAS 1.26:168152 ..... N83-25043* #
NAS 1.26:168153 ..... N83-24857* #
NAS 1.26:168166 ..... N83-24474* #
NAS 1.26:170133 ..... N83-25649* #
NAS 1.26:170185 ..... N83-25026* #
NAS 1.26:170213 ..... N83-25027* #
NAS 1.26:170246 ..... N83-25631* #
NAS 1.26:170260 ..... N83-25561* #
NAS 1.26:170275 ..... N83-25339* #
NAS 1.26:170277 ..... N83-25251* #
NAS 1.26:170278 ..... N83-24816 #
NAS 1.26:170279 ..... N83-25563* #
NAS 1.26:170280 ..... N83-24711* #
NAS 1.26:170281 ..... N83-24515* #
NAS 1.26:170305 ..... N83-25628* #
NAS 1.26:170306 ..... N83-24543* #
NAS 1.26:170307 ..... N83-25645* #
NAS 1.26:170308 ..... N83-25497* #
NAS 1.26:170309 ..... N83-24558* #
NAS 1.26:170310 ..... N83-25430* #
NAS 1.26:170311 ..... N83-25638* #
NAS 1.26:170312 ..... N83-24795* #
NAS 1.26:170313 ..... N83-24469* #
NAS 1.26:170315 ..... N83-25640* #
NAS 1.26:170316 ..... N83-25035* #
NAS 1.26:170317 ..... N83-24504* #
NAS 1.26:170318 ..... N83-25034* #
NAS 1.26:170322 ..... N83-25024* #
NAS 1.26:170323 ..... N83-24994* #
NAS 1.26:170324 ..... N83-24996* #
NAS 1.26:170326 ..... N83-24998* #
NAS 1.26:170327 ..... N83-24999* #
NAS 1.26:170328 ..... N83-25001* #
NAS 1.26:170329 ..... N83-25002* #
NAS 1.26:170330 ..... N83-24993*
NAS 1.26:170332 ..... N83-25343* #
NAS 1.26:170333 ..... N83-25039* #
NAS 1.26:170334 ..... N83-25344* #
NAS 1.26:170335 ..... N83-25634* #
NAS 1.26:170337 ..... N83-25238* #
NAS 1.26:170338 ..... N83-25505* #
NAS 1.26:170339 ..... N83-25641* #
NAS 1.26:170340 ..... N83-24796* #
NAS 1.26:170341 ..... N83-24920* #
NAS 1.26:170342 ..... N83-25586 #
NAS 1.26:170343 ..... N83-24797* #
NAS 1.26:170344 ..... N83-25538* #
NAS 1.26:170345 ..... N83-25637* #
NAS 1.26:170346 ..... N83-24710* #
NAS 1.26:170347 ..... N83-25006* #
NAS 1.26:170402 ..... N83-24513* #
NAS 1.26:170736 ..... N83-24541* #
NAS 1.26:170737 ..... N83-24694* #
NAS 1.26:170738 ..... N83-24727* #
NAS 1.26:170739 ..... N83-25266* #
NAS 1.26:170740 ..... N83-25267* #
NAS 1.26:170741 ..... N83-24529* #
NAS 1.26:170742 ..... N83-25537* #
NAS 1.26:170749 ..... N83-25543* #
NAS 1.26:170750 ..... N83-25544* #
NAS 1.26:170751 ..... N83-24537* #
NAS 1.26:170752 ..... N83-24833* #
NAS 1.26:170753 ..... N83-24765* #
NAS 1.26:170754 ..... N83-25040* #
NAS 1.26:170757 ..... N83-25379* #
NAS 1.26:170758 ..... N83-25545* #
NAS 1.26:170760 ..... N83-24531* #
NAS 1.26:170761 ..... N83-24538* #
NAS 1.26:170762 ..... N83-25320* #
NAS 1.26:170763 ..... N83-24507* #
NAS 1.26:171641 ..... N83-24806* #
NAS 1.26:171651 ..... N83-25350* #
NAS 1.26:171654 ..... N83-25348* #
NAS 1.26:171655 ..... N83-24550* #
NAS 1.26:171656 ..... N83-24551* #
NAS 1.26:171660 ..... N83-24527* #
NAS 1.26:171661 ..... N83-24526* #
NAS 1.55:2270 ..... N83-25265* #
NAS 1.55:2273 ..... N83-24861* #
NAS 1.55:2276 ..... N83-24556* #
NAS 1.60:2103 ..... N83-24808* #
NAS 1.60:2139 ..... N83-24641* #
NAS 1.60:2148 ..... N83-24575* #
NAS 1.60:2149 ..... N83-24640* #
NAS 1.60:2152 ..... N83-24562* #
NAS 1.60:2153 ..... N83-24561* #
NAS 1.60:2154 ..... N83-24862* #
NAS 1.60:2155 ..... N83-25438* #
NAS 1.60:2156 ..... N83-24509* #
NAS 1.60:2158 ..... N83-24478* #
NAS 1.60:2161 ..... N83-24695* #
NAS 1.60:2168 ..... N83-25646* #
NAS 1.61:1093 ..... N83-25636*
NAS 1.61:1102 ..... N83-24800* #
NAS 1.61:1104 ..... N83-24549* #

NASA-CASE-GSC-12223-1 ..... N83-25378*

NASA-CASE-LAR-12007-3 ..... N83-25542* #
NASA-CASE-LAR-12363-2 ..... N83-24763*
NASA-CASE-LAR-13065-1 ..... N83-25539* #

NASA-CASE-LEW-13834-1 ..... N83-24639* #

NASA-CASE-MFS-25302-2 ..... N83-24768* #
NASA-CASE-MFS-25509-1 ..... N83-24828*

NASA-CASE-NPO-15197-1 ..... N83-25346*
NASA-CASE-NPO-15220-1 ..... N83-25217*
NASA-CASE-NPO-15458-1 ..... N83-25587* #
NASA-CASE-NPO-15464-1 ..... N83-25540* #
NASA-CASE-NPO-15801-1 ..... N83-25541* #
NASA-CASE-NPO-16000-1 ..... N83-24842* #
NASA-CASE-NPO-16021-1 ..... N83-24769* #
NASA-CASE-NPO-16135-1 ..... N83-24572* #

NASA-CP-2270 ..... N83-25265* #
NASA-CP-2273 ..... N83-24881* #
NASA-CP-2276 ..... N83-24556* #

NASA-CR-3642 ..... N83-24479* #
NASA-CR-3688 ..... N83-24500* #
NASA-CR-165540 ..... N83-24516* #
NASA-CR-166063 ..... N83-24544* #
NASA-CR-166089 ..... N83-24488* #
NASA-CR-166097 ..... N83-25498* #
NASA-CR-166099 ..... N83-24876* #
NASA-CR-166105 ..... N83-24560* #
NASA-CR-166112 ..... N83-25433* #
NASA-CR-166113 ..... N83-25431* #
NASA-CR-166114 ..... N83-24766* #
NASA-CR-166115 ..... N83-25432* #
NASA-CR-166116 ..... N83-25377* #
NASA-CR-166117 ..... N83-25496* #
NASA-CR-166118 ..... N83-24512* #
NASA-CR-166478 ..... N83-25372* #
NASA-CR-168141 ..... N83-25112* #
NASA-CR-168152 ..... N83-25043* #
NASA-CR-168153 ..... N83-24857* #
NASA-CR-168166 ..... N83-24474* #
NASA-CR-170133 ..... N83-25649* #
NASA-CR-170185 ..... N83-25026* #
NASA-CR-170213 ..... N83-25027* #
NASA-CR-170246 ..... N83-25631* #
NASA-CR-170260 ..... N83-25561* #
NASA-CR-170275 ..... N83-25339* #
NASA-CR-170277 ..... N83-25251* #
NASA-CR-170278 ..... N83-24816 #
NASA-CR-170279 ..... N83-25563* #
NASA-CR-170280 ..... N83-24711* #
NASA-CR-170281 ..... N83-24515* #
NASA-CR-170305 ..... N83-25628* #
NASA-CR-170306 ..... N83-24543* #
NASA-CR-170307 ..... N83-25645* #
NASA-CR-170308 ..... N83-25497* #
NASA-CR-170309 ..... N83-24558* #
NASA-CR-170310 ..... N83-25430* #
NASA-CR-170311 ..... N83-25638* #
NASA-CR-170312 ..... N83-24795* #
NASA-CR-170313 ..... N83-24469* #
NASA-CR-170315 ..... N83-25640* #
NASA-CR-170316 ..... N83-25035* #
NASA-CR-170317 ..... N83-24504* #
NASA-CR-170318 ..... N83-25034* #
NASA-CR-170322 ..... N83-25024* #
NASA-CR-170323 ..... N83-24994* #
NASA-CR-170324 ..... N83-24996* #
NASA-CR-170326 ..... N83-24998* #
NASA-CR-170327 ..... N83-24999* #
NASA-CR-170328 ..... N83-25001* #
NASA-CR-170329 ..... N83-25002* #
NASA-CR-170330 ..... N83-24993*
NASA-CR-170332 ..... N83-25343* #
NASA-CR-170333 ..... N83-25039* #
NASA-CR-170334 ..... N83-25344* #
NASA-CR-170335 ..... N83-25634* #
NASA-CR-170337 ..... N83-25238* #
NASA-CR-170338 ..... N83-25505* #
NASA-CR-170339 ..... N83-25641* #
NASA-CR-170340 ..... N83-24796* #
NASA-CR-170341 ..... N83-24920* #
NASA-CR-170342 ..... N83-25586 #
NASA-CR-170343 ..... N83-24797* #
NASA-CR-170344 ..... N83-25538* #
NASA-CR-170345 ..... N83-25637* #
NASA-CR-170346 ..... N83-24710* #
NASA-CR-170347 ..... N83-25006* #
NASA-CR-170402 ..... N83-24513* #
NASA-CR-170736 ..... N83-24541* #
NASA-CR-170737 ..... N83-24694* #
NASA-CR-170738 ..... N83-24727* #
NASA-CR-170739 ..... N83-25266* #
NASA-CR-170740 ..... N83-25267* #
NASA-CR-170741 ..... N83-24529* #
NASA-CR-170742 ..... N83-25537* #
NASA-CR-170749 ..... N83-25543* #
NASA-CR-170750 ..... N83-25544* #
NASA-CR-170751 ..... N83-24537* #
NASA-CR-170752 ..... N83-24833* #
NASA-CR-170753 ..... N83-24765* #
NASA-CR-170754 ..... N83-25040* #
NASA-CR-170757 ..... N83-25379* #
NASA-CR-170758 ..... N83-25545* #
NASA-CR-170760 ..... N83-24531* #
NASA-CR-170761 ..... N83-24538* #
NASA-CR-170762 ..... N83-25320* #
NASA-CR-170763 ..... N83-24507* #
NASA-CR-171641 ..... N83-24806* #
NASA-CR-171651 ..... N83-25350* #
NASA-CR-171654 ..... N83-25348* #
NASA-CR-171655 ..... N83-24550* #
NASA-CR-171656 ..... N83-24551* #
NASA-CR-171660 ..... N83-24527* #
NASA-CR-171661 ..... N83-24526* #

NASA-NEWS-RELEASE-83-74 ..... N83-24532*

NASA-RP-1093 ..... N83-25636*
NASA-RP-1102 ..... N83-24800* #
NASA-RP-1104 ..... N83-24549* #

NASA-SP-447 ..... N83-25349* #
NASA-SP-7011(241) N83-25347*
NASA-SP-7037(160) N83-24466*
NASA-SP-7043(36) N83-25025*
NASA-SP-7046(07) N83-24525*

NASA-TM-77020 ..... N83-24555* #
NASA-TM-77041 ..... N83-24528* #
NASA-TM-77060 ..... N83-24573* #
NASA-TM-80695 ..... N83-25000* #
NASA-TM-82520 ..... N83-24553* #
NASA-TM-82521 ..... N83-24830* #
NASA-TM-82522 ..... N83-25268* #
NASA-TM-82524 ..... N83-24539* #
NASA-TM-82992 ..... N83-25625* #
NASA-TM-82999 ..... N83-25036* #
NASA-TM-83000 ..... N83-24636* #
NASA-TM-83059 ..... N83-24874* #
NASA-TM-83064 ..... N83-24552* #
NASA-TM-83310 ..... N83-25037* #
NASA-TM-83321 ..... N83-24559* #
NASA-TM-83340 ..... N83-24487* #
NASA-TM-83348 ..... N83-24506* #
NASA-TM-83352 ..... N83-24634* #
NASA-TM-83355 ..... N83-24638* #
NASA-TM-83356 ..... N83-24855* #
NASA-TM-83359 ..... N83-24505* #
NASA-TM-83366 ..... N83-24875* #
NASA-TM-83368 ..... N83-24635* #
NASA-TM-83369 ..... N83-24637* #
NASA-TM-83374 ..... N83-25041* #
NASA-TM-83375 ..... N83-25038* #
NASA-TM-83376 ..... N83-24467* #
NASA-TM-83378 ..... N83-24798* #
NASA-TM-83385 ..... N83-25042* #
NASA-TM-83386 ..... N83-24571* #
NASA-TM-83387 ..... N83-25499* #
NASA-TM-83389 ..... N83-24858* #
NASA-TM-83390 ..... N83-24764* #
NASA-TM-83396 ..... N83-24799* #
NASA-TM-83402 ..... N83-24856* #
NASA-TM-83409 ..... N83-24470* #
NASA-TM-84309 ..... N83-24473* #
NASA-TM-84317 ..... N83-25003* #
NASA-TM-84359 ..... N83-25630* #
NASA-TM-84363 ..... N83-24472* #
NASA-TM-84573 ..... N83-24471* #
NASA-TM-84591 ..... N83-24542* #
NASA-TM-84609 ..... N83-25337* #
NASA-TM-84610 ..... N83-24490* #
NASA-TM-84636 ..... N83-25525* #
NASA-TM-84655 ..... N83-25650* #
NASA-TM-84662 ..... N83-24794* #
NASA-TM-84953 ..... N83-24545* #
NASA-TM-84995 ..... N83-25317* #
NASA-TM-85006 ..... N83-24995* #
NASA-TM-85014 ..... N83-25639* #
NASA-TM-85178 ..... N83-24997* #

NASA-TM-85315 ..... N83-25629* #
NASA-TM-85328 ..... N83-24771* #
NASA-TM-85329 ..... N83-25269* #

NASA-TP-2103 ..... N83-24808* #
NASA-TP-2139 ..... N83-24841* #
NASA-TP-2148 ..... N83-24575* #
NASA-TP-2149 ..... N83-24840* #
NASA-TP-2152 ..... N83-24562* #
NASA-TP-2153 ..... N83-24561* #
NASA-TP-2154 ..... N83-24862* #
NASA-TP-2155 ..... N83-25438* #
NASA-TP-2156 ..... N83-24509* #
NASA-TP-2158 ..... N83-24478* #
NASA-TP-2161 ..... N83-24695* #
NASA-TP-2168 ..... N83-25646* #

NAVFAC-DM-3 ..... N83-24714 #

NAVFAC-EM-22 ..... N83-24714 #

NAVHLTHRSCHC-82-5 ..... N83-25352 #
NAVHLTHRSCHC-82-24 ..... N83-25354 #

NAVHLTLRSCHC-81-10 ..... N83-25360 #

NAVSEA-OD-29304B ..... N83-24869 #

NBSIR-82-1672 ..... N83-24800* #
NBSIR-82-2628 ..... N83-24915 #

NCAR/TN-185+PPR ..... N83-25339* #

NCEL-CR-82.030 ..... N83-24731 #
NCEL-CR-83.009 ..... N83-25399 #

NCEL-TN-1639 ..... N83-24835 #
NCEL-TN-1644 ..... N83-24579 #
NCEL-TN-1649 ..... N83-25340 #

NCSC-TM-362-82 ..... N83-25501 #

NFAP-82-308 ..... N83-25024* #

NMAB-380 ..... N83-24642 #

NMRI-82-1 ..... N83-25362 #
NMRI-82-3 ..... N83-25361 #
NMRI-82-4 ..... N83-25363 #

NOSC/TR-850 ..... N83-25460 #

NP-3901050 ..... N83-25012 #
NP-3901079 ..... N83-25236 #

NPS63-82-001 ..... N83-25246 #

NRC/CNR-TT-2059 ..... N83-24574 #

NRL-MR-4843 ..... N83-25411 #
NRL-MR-4975 ..... N83-24785 #
NRL-MR-4978 ..... N83-24815 #
NRL-MR-4983 ..... N83-24844 #
NRL-MR-5008 ..... N83-25507 #
NRL-MR-5009 ..... N83-25564 #

NRL-8643 ..... N83-24730 #
NRL-8645 ..... N83-24758 #

NRTC-82-24R ..... N83-24843 #

NSWC/TR-82-311 ..... N83-24497 #
NSWC/TR-82-465 ..... N83-25396 #
NSWC/TR-82-520 ..... N83-25502 #

NUSC-TM-82-2076A ..... N83-25403 #

OGU-011-82 ..... N83-24536 #

ONERA-NT-1981-7 ..... N83-25243 #

ORNL-TR-4917 ..... N83-25566 #

ORNL-5695-PT-1 ..... N83-25264 #
ORNL-5768 ..... N83-25013 #
ORNL-5900 ..... N83-25218 #

ORNL/CON-69 ..... N83-24827 #

ORNL/CSD-91 ..... N83-25435 #
ORNL/CSD-98 ..... N83-25491 #
ORNL/CSD-100 ..... N83-24801 #

ORNL/CSD/TM-168 ..... N83-25386 #

ORNL/CSO/TM-143 ..... N83-25434 #

ORNL/TM-7374 ..... N83-24724 #
ORNL/TM-7860 ..... N83-25367 #
ORNL/TM-7920 ..... N83-25021 #
ORNL/TM-8002 ..... N83-25558 #
ORNL/TM-8026 ..... N83-25387 #
ORNL/TM-8095 ..... N83-24912 #
ORNL/TM-8134 ..... N83-25508 #
ORNL/TM-8154 ..... N83-24591 #
ORNL/TM-8191 ..... N83-24629 #
ORNL/TM-8256 ..... N83-25571 #
ORNL/TM-8323 ..... N83-25140 #
ORNL/TM-8366 ..... N83-24821 #
ORNL/TM-8420 ..... N83-25585 #
ORNL/TM-8483 ..... N83-24823 #

ORO-2408-210 ..... N83-25523 #

PDE-216 ..... N83-24718 #

PFC/RR-82-30 ..... N83-25575 #

PMA-82-363 ..... N83-25463 #

PMTC-TP-000001 ..... N83-25323 #
PMTC-TP-000002 ..... N83-25322 #

PNL-SA-10310 ..... N83-25620 #
PNL-SA-10365 ..... N83-25528 #
PNL-SA-10385-A ..... N83-25527 #
PNL-SA-10536 ..... N83-24678 #

PNL-21-10455 ..... N83-24871 #
PNL-1962-REV ..... N83-25049 #
PNL-4066 ..... N83-25153 #
PNL-4277 ..... N83-24621 #
PNL-4723 ..... N83-24998* #

POLY-MRI-1424-82 ..... N83-24761 #

PR-3 ..... N83-25224 #

PREPRINT-SER-010 ..... N83-25630* #

PRI-50 ..... N83-25569 #

PSI-TR-334 ..... N83-24599 #

PSR-1225 ..... N83-24747 #

PUBL-1900 ..... N83-25218 #

PX-14014 ..... N83-25551 #

P83-10085 ..... N83-24532*

QR-1 ..... N83-24998* #
QR-2 ..... N83-25150 #
QR-3 ..... N83-24598 #
QR-4 ..... N83-24608 #
QR-5 ..... N83-24602 #
QR-7 ..... N83-24599 #
QR-13 ..... N83-24622 #
QR-15 ..... N83-24597 #

R-911 ..... N83-25488 #
R-940 ..... N83-25588 #
R-941 ..... N83-24782 #
R-958 ..... N83-25590 #
R-978 ..... N83-25461 #

RADC-TR-82-190 ..... N83-24748 #
RADC-TR-82-198 ..... N83-24547 #
RADC-TR-82-225 ..... N83-24546 #
RADC-TR-82-260 ..... N83-25555 #
RADC-TR-82-261 ..... N83-25557 #
RADC-TR-82-263 ..... N83-25414 #
RADC-TR-82-276 ..... N83-25456 #
RADC-TR-82-277 ..... N83-25402 #
RADC-TR-82-280 ..... N83-24749 #
RADC-TR-82-281 ..... N83-25550 #
RADC-TR-82-285 ..... N83-25548 #
RADC-TR-82-289 ..... N83-24746 #
RADC-TR-82-297 ..... N83-24759 #

RCC/MG-360-82 ..... N83-25255 #

RD-2-83 ..... N83-24507* #

REPT-2DOE-MHD-D91 ..... N83-25228 #
REPT-7 ..... N83-25465 #
REPT-11 ..... N83-25397 #
REPT-61 ..... N83-24585 #
REPT-82SRC43 ..... N83-24546 #
REPT-83-2 ..... N83-25433* #
REPT-83-4 ..... N83-25431* #
REPT-83-5 ..... N83-24766* #

REPT-83-6 ..... N83-25432* #
REPT-221-2 ..... N83-25374 #
REPT-336 ..... N83-25006* #
REPT-723 ..... N83-25627
REPT-1982-3 ..... N83-25592 #
REPT-3550-F ..... N83-24715 #
REPT-7102-F-1 ..... N83-24513* #
REPT-15512 ..... N83-25555 #
REPT-019277-A ..... N83-25258 #
REPT-019277-C ..... N83-25019 #

RFP-TRANS-365 ..... N83-24631 #

RFP-3046-1 ..... N83-25151 #
RFP-3279 ..... N83-24840 #
RFP-3298 ..... N83-24831 #

RLE-PR-124 ..... N83-25493 #

RR-CE-18 ..... N83-24802 #
RR-CE-19 ..... N83-24877 #
RR-CE-20 ..... N83-24879 #
RR-CE-23 ..... N83-24803 #
RR-CE-25 ..... N83-24878 #
RR-CE-26 ..... N83-24729 #
RR-CE-27 ..... N83-25436 #
RR-CE-28 ..... N83-24804 #

RR-E2-04368 ..... N83-25024* #

R82-954566-F ..... N83-24584 #

SAI-067-83R-006 ..... N83-24814 #
SAI-254-82-244-LJ ..... N83-25569 #

SAM-TR-82-25 ..... N83-25366 #
SAM-TR-82-34 ..... N83-25345 #

SAND-77-1332-REV ..... N83-24820 #
SAND-80-2560 ..... N83-25168 #
SAND-81-0510 ..... N83-24486 #
SAND-81-0984 ..... N83-25176 #
SAND-81-1522C ..... N83-25226 #
SAND-81-1868C ..... N83-25088 #
SAND-81-2240C ..... N83-25193 #
SAND-81-2390C ..... N83-25142 #
SAND-81-2549C ..... N83-25626 #
SAND-81-7080/4 ..... N83-25174 #
SAND-81-7085/8-VOL-8 ..... N83-25189 #
SAND-81-7085/14 ..... N83-25202 #
SAND-81-7086/14 ..... N83-25130 #
SAND-81-7087/3 ..... N83-25173 #
SAND-81-7087/6 ..... N83-25167 #
SAND-81-7188 ..... N83-25172 #
SAND-82-0125C ..... N83-25602 #
SAND-82-0224C ..... N83-25194 #
SAND-82-0435 ..... N83-24824 #
SAND-82-0956C ..... N83-25139 #
SAND-82-1404C ..... N83-24866 #
SAND-82-1435C ..... N83-25146 #
SAND-82-1486C ..... N83-25603 #
SAND-82-1518C ..... N83-24787 #
SAND-82-1524 ..... N83-24693 #
SAND-82-1584 ..... N83-25474 #
SAND-82-1600 ..... N83-25171 #
SAND-82-1631C ..... N83-24916 #
SAND-82-1789C ..... N83-24917 #
SAND-82-1841C ..... N83-24722 #
SAND-82-1908C ..... N83-25423 #
SAND-82-2175 ..... N83-25426 #
SAND-82-2393 ..... N83-24839 #
SAND-82-7003/1 ..... N83-25154 #
SAND-82-7075C ..... N83-25190 #
SAND-82-7127 ..... N83-25560 #
SAND-82-8002 ..... N83-25192 #
SAND-82-8016 ..... N83-25385 #
SAND-82-8184 ..... N83-25128 #
SAND-82-8224 ..... N83-24689 #
SAND-82-8230 ..... N83-24557 #
SAND-82-8252 ..... N83-24919 #

SAPR-22/23 ..... N83-25631* #
SAPR-47 ..... N83-24920* #

SCIENTIFIC-1 ..... N83-25257 #
SCIENTIFIC-2 ..... N83-25469 #

SD-TR-81-106 ..... N83-25647 #
SD-TR-82-83 ..... N83-24587 #
SD-TR-82-88 ..... N83-24565 #
SD-TR-82-90 ..... N83-24582 #
SD-TR-82-92 ..... N83-25600 #

SERI/CP-214-1403 ..... N83-25093 #

SERI/PR-211-1589 ..... N83-25150 #

SERI/PR-234-1850 ..... N83-24633 #
SERI/PR-8002-7-T4 ..... N83-25047 #
SERI/PR-8143-1-T7 ..... N83-25191 #

SERI/RR-252-1393 ..... N83-25196 #

SERI/TP-211-1647 ..... N83-25333 #
SERI/TP-234-1654 ..... N83-25144 #
SERI/TP-254-1652 ..... N83-25135 #
SERI/TP-254-1673 ..... N83-25134 #
SERI/TP-255-1507 ..... N83-25197 #

SERI/TR-215-1490 ..... N83-25178 #

SM-G3-04400 ..... N83-24995* #

SNIAS-822-111-102 ..... N83-24501 #

SOLAR/1060-82/50 ..... N83-25195 #

SR-1 ..... N83-24481 #
SR-1 ..... N83-24535 #
SR-1 ..... N83-25404 #
SR-1 ..... N83-25413* #
SR-1 ..... N83-25467 #
SR-2 ..... N83-25328 #

SRA-R93-0007-F ..... N83-24756 #

SU-IPR-REPT-956 ..... N83-25645* #

SU-IPR-933 ..... N83-25649* #

SU-SOL-82-17 ..... N83-25442 #

SU-STAN-CS-82-949 ..... N83-25450 #

SU-SUIPR-928 ..... N83-25505* #
SU-SUIPR-945 ..... N83-25251* #

SUNYBUF/DC/TR-11 ..... N83-24580 #

SWRI-02-5748 ..... N83-24563 #

T-123 ..... N83-25489 #

TAE-468 ..... N83-24576 #

TE-4258-442-82 ..... N83-25203 #

TELIC-82-3 ..... N83-24687 #

TENRAC/EDF-067 ..... N83-25213 #
TENRAC/EDF-070-PT-1 ..... N83-24725 #
TENRAC/EDF-070-PT-2 ..... N83-24726 #
TENRAC/EDF-071 ..... N83-25212 #

TF-18 ..... N83-24816 #

TIS-83-SDS-006 ..... N83-25392 #

TM-82-6A ..... N83-25211 #

TN-SM-82-9 ..... N83-24538* #

TPR-8 ..... N83-25191 #

TR-CRINC-FRL-467-1 ..... N83-24796* #

TR-1 ..... N83-24837 #
TR-1 ..... N83-25543* #
TR-2 ..... N83-24750 #
TR-2 ..... N83-24909 #
TR-2 ..... N83-25544* #
TR-2 ..... N83-25545* #
TR-4 ..... N83-25458 #
TR-5 ..... N83-24834 #
TR-5 ..... N83-24846 #
TR-6 ..... N83-24564 #
TR-8 ..... N83-24760 #
TR-8 ..... N83-25370 #
TR-9-SER-B ..... N83-25370 #
TR-14 ..... N83-25553 #
TR-15 ..... N83-24910 #
TR-18 ..... N83-24583 #
TR-26 ..... N83-25468 #
TR-41 ..... N83-25589 #
TR-41 ..... N83-25597 #
TR-42 ..... N83-25598 #
TR-82-2 ..... N83-25338 #
TR-82-27 ..... N83-25466 #
TR-85 ..... N83-24767 #
TR-86 ..... N83-25397 #
TR-87 ..... N83-25477 #
TR-92 ..... N83-25388 #
TR-159 ..... N83-24781 #

TR-564 ..... N83-24745 #
TR-0082(2448)-1 ..... N83-24587 #
TR-0082(2726-01)-1 ..... N83-24565 #
TR-0082(2940-01)-1 ..... N83-25647 #
TR-0083(3925-01)-3 ..... N83-24582 #
TR-0083(3945-06)-2 ..... N83-25600 #
TB-1197 ..... N83-25617 #
TR-1981:49T ..... N83-25240 #

TR82-MSFC-34431-048 ..... N83-24529* #

TS-126 ..... N83-24499 #

TSR-4 ..... N83-25152 #

TULEA-1981:22 ..... N83-25241 #
TULEA-1981:28 ..... N83-25048 #

UCID-1969 ..... N83-24595 #
UCID-19487 ..... N83-24569 #
UCID-19488 ..... N83-24762 #
UCID-19494 ..... N83-25583 #
UCID-19495 ..... N83-25518 #
UCID-19505 ..... N83-25425 #
UCID-19648 ..... N83-25584 #
UCID-19659 ..... N83-24789 #
UCID-19677 ..... N83-24911 #

UCLA-ENG-82-78 ..... N83-24567 #

UCRL-52000-82-11 ..... N83-25115 #
UCRL-53239 ..... N83-25395 #
UCRL-53292-PT-1 ..... N83-25428 #
UCRL-53295 ..... N83-25582 #
UCRL-53298 ..... N83-24709 #
UCRL-53313 ..... N83-25619 #
UCRL-86013-REV-1 ..... N83-24850 #
UCRL-86582 ..... N83-25530 #
UCRL-86739 ..... N83-24867 #
UCRL-86893 ..... N83-24849 #
UCRL-86894 ..... N83-24706 #
UCRL-87021 ..... N83-25581 #
UCRL-87256 ..... N83-25225 #
UCRL-87279 ..... N83-25512 #
UCRL-87392 ..... N83-24685 #
UCRL-87454-REV-1 ..... N83-25573 #
UCRL-87474 ..... N83-25471 #
UCRL-87510 ..... N83-25535 #
UCRL-87525 ..... N83-25259 #
UCRL-87689 ..... N83-24605 #
UCRL-87780 ..... N83-24614 #
UCRL-87789 ..... N83-24604 #
UCRL-87795 ..... N83-25429 #
UCRL-87805 ..... N83-25504 #
UCRL-87827 ..... N83-24568 #
UCRL-87948 ..... N83-25570 #
UCRL-87964 ..... N83-24854 #
UCRL-87980 ..... N83-25580 #
UCRL-87983 ..... N83-25578 #
UCRL-88037 ..... N83-25513 #

UDR-TR-82-64 ..... N83-24510 #
UDR-TR-82-105 ..... N83-24697 #
UDR-TR-82-133 ..... N83-24694* #

UIEM-83-1 ..... N83-24757 #

UILU-ENG-81-2242 ..... N83-25488 #
UILU-ENG-82-2206 ..... N83-25588 #
UILU-ENG-82-2207 ..... N83-24782 #
UILU-ENG-82-2224 ..... N83-25590 #
UILU-ENG-82-2244 ..... N83-25461 #
UILU-ENG-83-2538 ..... N83-24757 #

UNC/ORSA/TR-82/5 ..... N83-25480 #
UNC/ORSA/TR-82/7 ..... N83-25479 #
UNC/ORSA/TR-82/8 ..... N83-25478 #

UNI-SA-88 ..... N83-25376 #

UPITT/LRDC/ONR/APS-10 ..... N83-25454 #
UPITT/LRDC/ONR/APS-12 ..... N83-25369 #

US-PATENT-APPL-SN-041143 ..... N83-25378*
US-PATENT-APPL-SN-246777 ..... N83-25217*
US-PATENT-APPL-SN-263957 ..... N83-25346*
US-PATENT-APPL-SN-297486 ..... N83-24828*
US-PATENT-APPL-SN-342828 ..... N83-25540* #
US-PATENT-APPL-SN-352831 ..... N83-25542* #
US-PATENT-APPL-SN-376306 ..... N83-25587* #
US-PATENT-APPL-SN-377892 ..... N83-24763*
US-PATENT-APPL-SN-384547 ..... N83-24842* #
US-PATENT-APPL-SN-402205 ..... N83-24769* #
US-PATENT-APPL-SN-470114 ..... N83-24572* #
US-PATENT-APPL-SN-478130 ..... N83-25541* #
US-PATENT-APPL-SN-478131 ..... N83-24639* #

US-PATENT-APPL-SN-481086 ..... N83-24788* #
US-PATENT-APPL-SN-484745 ..... N83-25539* #

US-PATENT-CLASS-34-57A N83-24828*
US-PATENT-CLASS-73-863.31 ..... N83-25217*
US-PATENT-CLASS-73-863.83 ..... N83-25217*
US-PATENT-CLASS-73-864.63 ..... N83-25217*
US-PATENT-CLASS-128-303B N83-25346*
US-PATENT-CLASS-128-774 ..... N83-25346*
US-PATENT-CLASS-128-782 ..... N83-25346*
US-PATENT-CLASS-156-DIG.62 ..... N83-24828*
US-PATENT-CLASS-220-335 ..... N83-25217*
US-PATENT-CLASS-250-388 ..... N83-24763*
US-PATENT-CLASS-364-200 ..... N83-25378*
US-PATENT-CLASS-432-58 ..... N83-24828*
US-PATENT-CLASS-432-227 ..... N83-24828*

US-PATENT-4,377,949 ..... N83-25217*
US-PATENT-4,378,209 ..... N83-24828*
US-PATENT-4,378,813 ..... N83-25346*
US-PATENT-4,379,970 ..... N83-24763*
US-PATENT-4,380,046 ..... N83-25378*

USAFETAC/DS-82/050 ..... N83-25330 #

USAFETAC/TN-82/004 ..... N83-25325 #
USAFETAC/TN-82/006 ..... N83-25324 #

USCG-D-54-82 ..... N83-24496 #

USCG-373-82 ..... N83-25342 #

USGS-CIRC-861 ..... N83-24921 #

USNA-TSPR-118 ..... N83-24836 #
USNA-TSPR-120 ..... N83-25114 #

UWFDM-466 ..... N83-25579 #
UWFDM-474 ..... N83-25574 #

VI-644 ..... N83-24481 #

WAOENG-81-02-2 ..... N83-25148 #

WAPD-TM-1406 ..... N83-24684 #
WAPD-TM-1515 ..... N83-24736 #

WES/MP/SL-82-15 ..... N83-24732 #

WES/TR/SL-82-9 ..... N83-24702 #
WES/TR/SL-82-10 ..... N83-24733 #

WHOI-82-45 ..... N83-24932 #

WP-35 ..... N83-25415 #
WP-82-451/0641 ..... N83-24736 #

Y-2250 ..... N83-24728 #
Y-2250 ..... N83-24734 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983—381-564/314

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*', from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MAIL

5 1 STAR, 830725 S01733HU
UNIV OF MICHIGAN
GRADUATE LIBRARY
DOCUMENT UNIT SERIALS DIV
ANN ARBOR MI 48109

...ASTER: If Undeliverable (Section
Postal Manual) Do Not R

e (Section
Do Not R